

by Jon D. McCracken
Michael S. W. Bradstreet
Geoffrey L. Holroyd

Breeding birds of Long Point, Lake Erie



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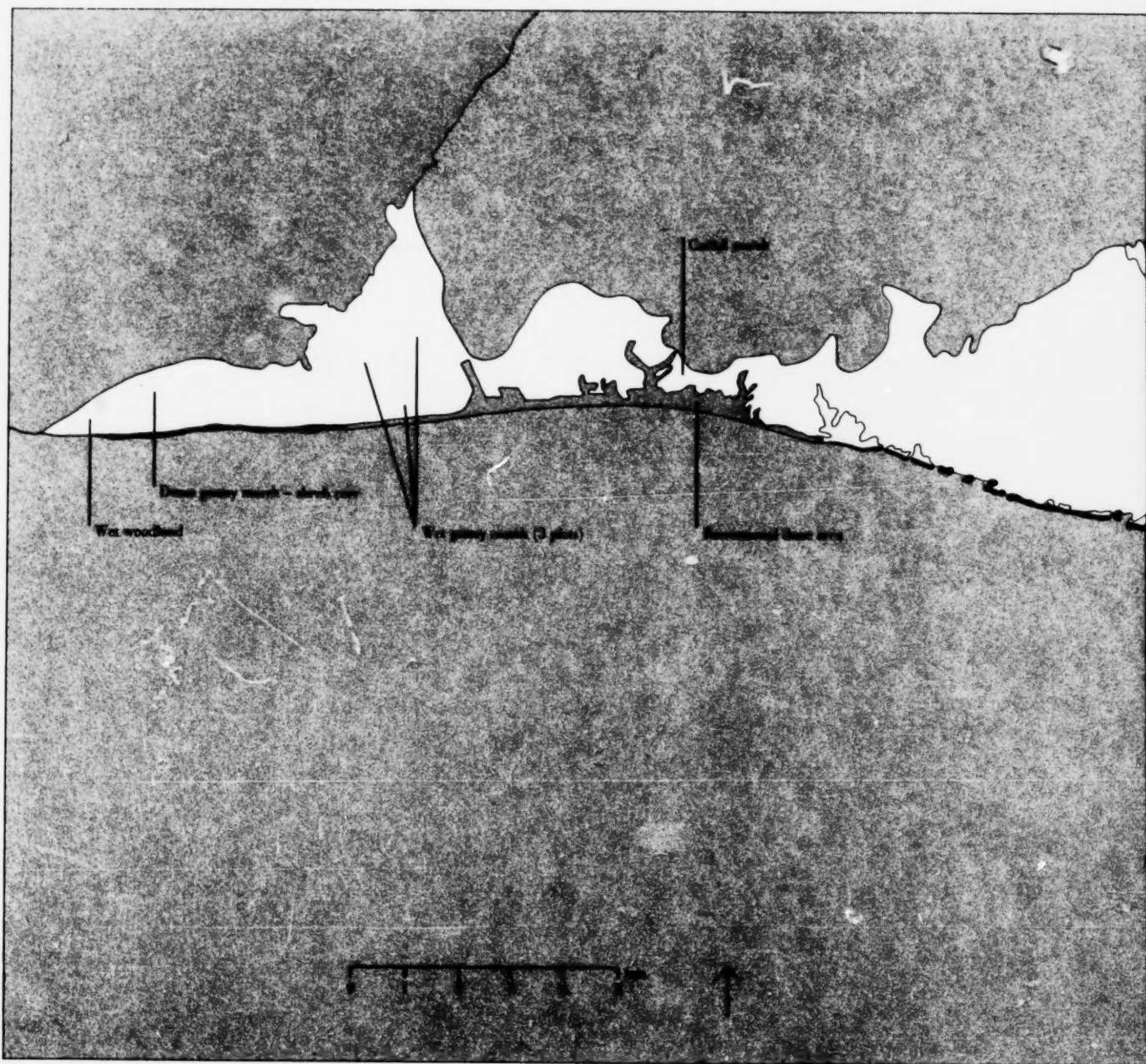


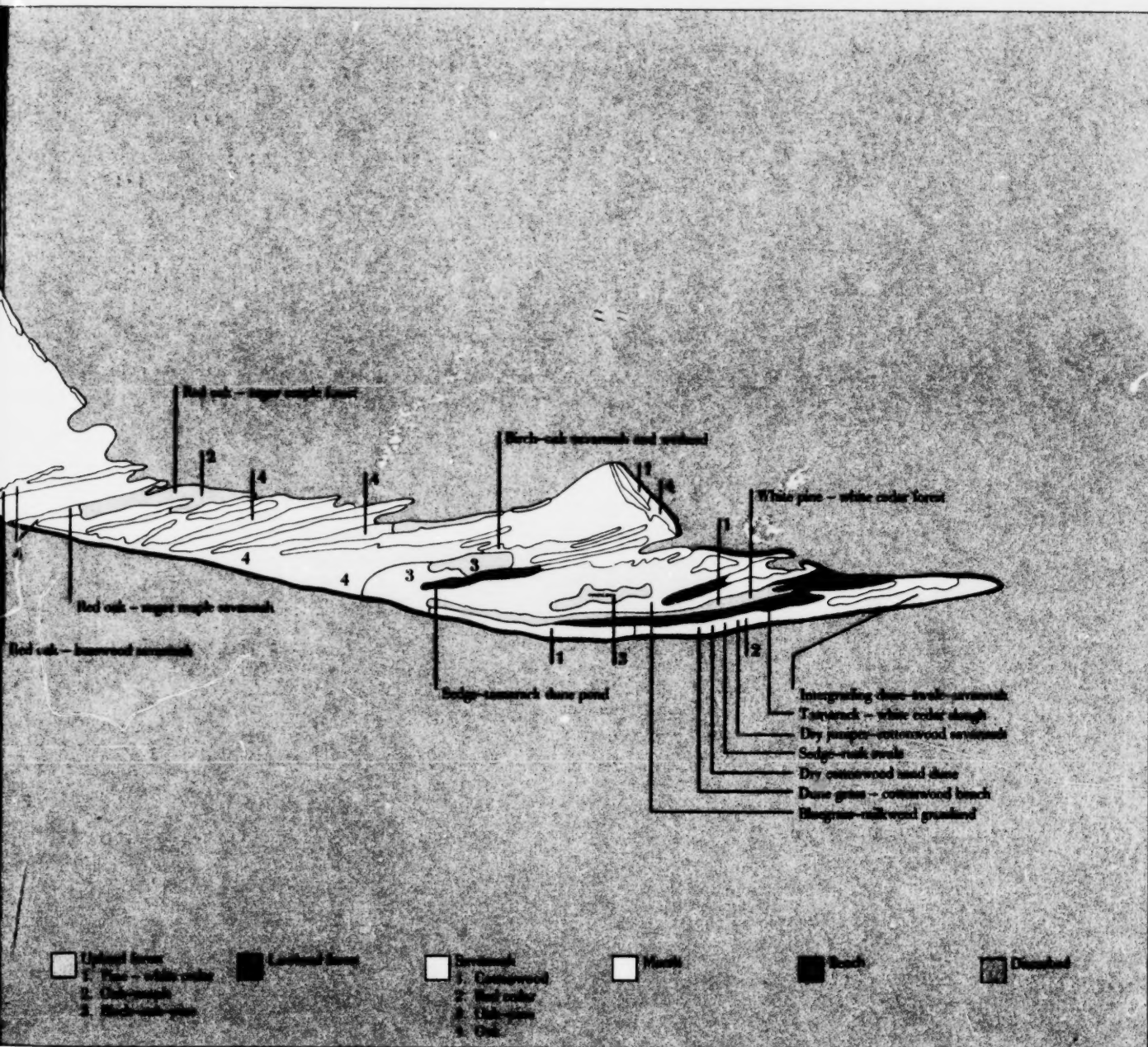
Figure 5

Vegetation of Long Point, modified from Holthorn 1973, and locations of breeding bird census plots.

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Figure 5







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The tract of country named Long Point is not characterized by a partial beauty or luxuriance. Nature has been equally kind to every part of it, and no one can attain a correct idea of its charms, unless he makes a journey through it.

John Howison 1821



Breeding birds of Long Point, Lake Erie:

A study in community succession

*Jon D. McCracken

†Michael S. W. Bradstreet

‡Geoffrey L. Holroyd

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* Long Point Bird Observatory,
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† LGL Ltd., environmental research associates,
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‡ Canadian Wildlife Service,
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Front cover:

Top. Long-billed Marsh Wren

(photo: M. Bradstreet)

Bottom left. Red-winged Blackbird young

(photo: D. Gow)

Bottom centre. Thoroughfare Point, CWS and
Long Point Company marshes

(photo: G. McKeating)

Bottom right. Black Tern chick and egg

(photo: M. Field)

Back cover:

Top. MOT lighthouse at tip of Point

(photo: G. McKeating)

Bottom left. Common Gallinule

(photo: G. McKeating)

Bottom centre. Common Gallinule nest

(photo: D. Gow)

Bottom right. Prothonotary Warbler

(photo: J. McCracken)

Photo opposite title page: G. McKeating

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Abstract

One hundred and fifteen species of birds are believed to have nested on Long Point. Of these, 98 are confirmed on the basis of nests or flightless young; the rest are included on the basis of frequent sightings. These include two endangered species (Bald Eagle and Piping Plover) and such rare or potentially threatened species as King Rail, Little Gull, Forster's Tern, and Prothonotary Warbler. With the exception of marsh birds, the density of breeding birds is greater on the adjacent mainland than on the Point itself.

Twenty breeding-bird plots were established in the major habitats on Long Point. Data from these censuses permit an overall summary of the features of vegetation and bird succession in dune and marsh systems at Long Point.

Three broad categories of succession are recognized in dune habitats: early, middle, and late. The early successional stage consists of dune grass - cottonwood beach, dry cottonwood sand dune, sedge-rush swale, and dry juniper-cottonwood savannah. The middle stage consists of tamarack - white cedar slough, white pine - white cedar forest, sedge-tamarack dune pond, and birch-oak savannah and wetland. The late successional stage consists of a red oak - basswood savannah and a red oak - sugar maple forest. Tree sizes, densities, and heights generally increase through each successional zone, as do

ground and canopy covers.

Characteristic birds of the early successional stage are Eastern Kingbird, Redwinged Blackbird, Field Sparrow, Starling, Mallard, Eastern Meadowlark, Song Sparrow, Common Grackle, Killdeer, and Brown Thrasher. This stage is characterized by relatively low levels of population density (86 territories/km²) and species diversity ($\bar{H} = 1.10$). The simple breeding-bird communities in early successional zones probably reflect both the lack of tree cover and the paucity of ground cover.

Species diversity ($\bar{H} = 2.37$), equitability ($J' = 0.91$), and density (875/km²) are much greater in the middle successional stage than in the early stage. Characteristic species are: Redwinged Blackbird, House Wren, Tree Swallow, Northern Oriole, Eastern Kingbird, Common Grackle, Common Yellowthroat, Eastern Wood Pewee, Chipping Sparrow, and Yellow Warbler.

The bird community in late successional stages is similar to that found in the middle stage. Characteristic species are: Redwinged Blackbird, Eastern Wood Pewee, House Wren, Tree Swallow, Common Grackle, Starling, Northern Oriole, Eastern Kingbird, Common Yellowthroat, and Yellow Warbler. Species diversity in the oak savannahs and forests of Long Point ($\bar{H} = 2.40$) is generally less than in mainland forests. However, the breeding density on Long Point (948/km²) seems to be greater than for comparable areas on the mainland.

Bird species diversity ($\bar{H}$) and species richness peak in the middle stages of dune succession at Long Point, and then decline slightly in the late successional zones. Territorial densities increase through most of the successional sequence but dip in the climax oak-maple forest. Diversity of breeding-bird communities at Long Point is correlated with diversity in the density and dominance of all trees by size class, as well as with diversity of tree species.

Based on the areas of the various terrestrial habitats present on Long Point, we estimate the total population of territorial males to be roughly 13 300. The 10 most

common species in terrestrial habitats were Redwinged Blackbird, Eastern Wood Pewee, Tree Swallow, House Wren, Common Grackle, Yellow Warbler, Northern Oriole, Common Yellowthroat, Eastern Kingbird, and Starling.

The marshes and wetlands of Long Point support a rich avifauna. We studied four types of marshland at the base of the Point. These followed the patterns of marsh succession and were: cattail marsh, wet grassy marsh, dense grassy marsh – shrub carr, and wet woodland.

Breeding-bird density is greatest ($4312/\text{km}^2$) in the small beds of cattail surrounded by open water areas. However, bird species diversity ($\bar{H} = 0.60$) and equitability ($J' = 0.37$) are minimal. Characteristic species of this simple habitat are Redwinged Blackbird, Black Tern, Common Gallinule, and Long-billed Marsh Wren.

Although breeding densities are lower ($809/\text{km}^2$) in the next seral stage (wet grassy marsh), this stage supports a much more diverse bird community ($\bar{H} = 1.76$), presumably because the habitat is more heterogeneous. Characteristic species here are Redwinged Blackbird, Long-billed Marsh Wren, Swamp Sparrow, Common Yellowthroat, Common Gallinule, Virginia Rail, American Coot, Mallard, and Sora.

The dense grassy marsh – shrub carr stage is structurally simpler than the wet grassy marsh stage, and territorial density ($578/\text{km}^2$) and bird species diversity ($\bar{H} = 1.51$) are lower as a result. Characteristic species are Redwinged Blackbird, Swamp Sparrow, and Common Yellowthroat.

In the wet woodland, densities increase ($1204/\text{km}^2$) and bird species diversity ($\bar{H} = 2.78$) and equitability ($J' = 0.85$) reach their peak levels. Dead trees are an important component of the habitat; they provide a variety of nesting opportunities for a variety of species. Characteristic species in the wet woodland are Common Grackle, Tree Swallow, Starling, Redwinged Blackbird, Canada Goose, Mourning Dove, Prothonotary Warbler, House Wren, and Blue-gray Gnatcatcher.

Résumé

On évalue à 115 le nombre d'espèces ayant niché à Long Point; la présence de 98 d'entre elles a été confirmée par la découverte de nids ou de juvéniles incapables de voler, tandis que pour les autres, on se fonde sur des observations fréquentes. On y trouve deux espèces menacées d'extinction (l'Aigle à tête blanche et le Pluvier siffleur) ainsi que des espèces rares ou potentiellement menacées telles que le Râle élégant, la Mouette pygmée, la Sterne de Forster et la Fauvette orangée. Exception faite des oiseaux de marais, la densité d'oiseaux nicheurs est plus forte sur les terres adjacentes que sur la pointe elle-même.

Pour le dénombrement des oiseaux nicheurs, vingt parcelles ont été établies dans les principaux habitats de Long Point. Les données de ces recensements donnent un aperçu des caractéristiques évolutives de la végétation et de l'avifaune dans les complexes dunaires et marécageux de Long Point.

On relève trois grands stades évolutifs dans les habitats dunaires, soit les stades précoce, intermédiaire et tardif. Le stade précoce est constitué des zones suivantes: herbes dunaires et grèves de peupliers; dunes sèches couvertes de peupliers; dépressions marécageuses de carex et de joncs; savanes sèches de genévriers et de peupliers. Le stade intermédiaire est le suivant: fondrières de mélèzes et de thuyas occidentaux; forêts de pins blancs et de thuyas occidentaux; étangs dunaires de carex et de mélèzes; savanes de bouleaux et de chênes et marécages. Quant au stade tardif, il consiste en une savane de chênes rouges et de tilleuls d'Amérique, et en une forêt de chênes rouges et d'érables à sucre. La dimension, la densité et la taille des arbres s'accroissent généralement d'une zone à l'autre, tout comme l'importance du couvert et de la couverture vivante.

Les oiseaux qui caractérisent le stade évolutif précoce sont: le Tyran tritri, le Carouge à épaulettes, le Pinson des champs, l'Étourneau sansonnet, le Canard malard, la Sturnelle des prés, le Pinson chanteur, le Mainate bronzé, le Pluvier kildir et le Moqueur roux. Ce stade a une densité de population (86 territoires/ km^2) et une diversité d'espèces

($\bar{H} = 1.10$) relativement faibles. Les communautés d'oiseaux nicheurs dans les zones précoces sont peu complexes, ce qui est probablement dû à l'absence de couvert forestier et à la pauvreté de la couverture vivante.

La diversité ($\bar{H} = 2.37$), l'équitabilité ($J' = 0.91$) et la densité ($875/\text{km}^2$) des espèces sont beaucoup plus élevées dans le stade évolutif intermédiaire que dans le stade précoce. Les espèces caractéristiques sont: le Carouge à épaulettes, le Pioui de l'Est, le Troglodyte familier, l'Hirondelle bicolor, l'Oriole orangé, le Tyran tritri, le Mainate bronzé, la Fauvette masquée, le Pioui de l'Est, le Pinson familier et la Fauvette jaune.

L'avifaune associée au stade tardif est similaire à celle que l'on trouve dans le stade intermédiaire. Les espèces caractéristiques sont le Carouge à épaulettes, le Pioui de l'Est, le Troglodyte familier, l'Hirondelle bicolor, le Mainate bronzé, l'Étourneau sansonnet, l'Oriole orangé, le Tyran tritri, la Fauvette masquée et la Fauvette jaune. La diversité des espèces dans les savanes et les forêts de chênes de Long Point ($\bar{H} = 2.40$) est généralement moindre que dans les forêts de l'intérieur des terres. Toutefois, la densité des nids à Long Point ($948/\text{km}^2$) semble être plus forte que dans des zones comparables à l'intérieur des terres.

La diversité ($\bar{H}$) et la richesse des espèces aviaires atteignent un sommet dans les étapes intermédiaires du processus évolutif dunaire à Long Point, pour ensuite décliner légèrement dans les zones tardives. En général, les densités territoriales augmentent en fonction du cycle évolutif, mais elles chutent dans les forêts-climax de chênes et d'érables. La diversité des communautés d'oiseaux nicheurs à Long Point correspond à la diversité de densité et de dominance de tous les arbres par classe de dimension, ainsi qu'à la diversité des espèces d'arbres.

D'après la superficie des différents habitats terrestres constatés à Long Point, nous estimons à quelque 13 300 la population totale de mâles y ayant établi un territoire. Les 10 espèces les plus communes dans les habitats terrestres sont le Carouge à épaulettes, le Pioui

de l'Est, l'Hirondelle bicolore, le Troglodyte familier, le Mainate bronzé, la Fauvette jaune, l'Oriole orangé, la Fauvette masquée, le Tyrann tritri et l'Étourneau sansonnet.

Les marais et les marécages de Long Point abritent une riche avifaune. Nous avons étudié quatre types de terres humides à la base de la pointe, et ceux-ci correspondent au processus normal d'évolution des marais: marais de quenouilles; marais herbeux et humide; marais d'herbes denses et carr arbustif; boisés humides.

On relève la plus forte densité d'oiseaux nicheurs ($4312/\text{km}^2$) dans les petits lits de quenouilles entourés de plans d'eau. Toutefois, la diversité ($\bar{H} = 0.60$) et l'équitabilité ($J' = 0.37$) des espèces y sont minimales. Les espèces qui caractérisent cet habitat simple sont le Carouge à épaulettes, la Sterne noire, la Gallinule commune et le Troglodyte des marais.

Même si les densités de nids sont plus faibles ($809/\text{km}^2$) dans le stade sériel suivant (marais herbeux et humide), celui-ci abrite une communauté aviaire beaucoup plus diversifiée ($\bar{H} = 1.76$) à cause, présumément, de la plus grande hétérogénéité de l'habitat. Les espèces caractéristiques sont le Carouge à épaulettes, le Troglodyte des marais, le Pinson des marais, la Fauvette masquée, la Gallinule commune, le Râle de Virginie, la Foulque d'Amérique, le Canard malard et le Râle de Caroline.

Le stade du marais d'herbes denses et du carr arbustif est, sur le plan de la structure, plus simple que le stade du marais herbeux et humide; par conséquent, la densité territoriale ($578/\text{km}^2$) et la diversité ($\bar{H} = 1.51$) des espèces aviaires y sont plus faibles. Les espèces caractéristiques sont le Carouge à épaulettes, le Pinson des marais et la Fauvette masquée.

Dans les boisés humides, les densités augmentent ($1204/\text{km}^2$) tandis que la diversité ($\bar{H} = 2.78$) et l'équitabilité ($J' = 0.85$) des espèces atteignent un sommet. Les arbres morts constituent un élément important de l'habitat; ils fournissent toute une variété d'emplacements propices à la nidification de différentes espèces. Les espèces qui caractérisent les boisés humides sont le Mainate bronzé,

l'Hirondelle bicolore, l'Étourneau sansonnet, le Carouge à épaulettes, la Bernache du Canada, la Tourterelle triste, la Fauvette orangée, le Troglodyte familier et le Gobe-mouches gris-bleu.

Introduction

Long Point is one of the best examples of dune and marsh ecosystems on the Great Lakes. It reaches nearly 35 km into Lake Erie and contains a great assortment of habitats.

The vegetation communities on Long Point pass through several distinct successional stages, ranging from scattered grasses immediately behind the shore, through progressively more complex communities on the dunes, to the climax red oak – sugar maple forest of the older ridges. More than 60 species of plants occurring on Long Point are rare in Ontario; 5 occur nowhere else in Canada.

The animal populations of Long Point are also rich. The shores and marshes are valuable spawning and foraging grounds for many fish species, including three that are rare or threatened in Canada. The herpetological fauna is one of the Point's most notable features. Many common amphibian and reptile species occur here and at least five rare or threatened species can also be found in significant numbers.

Long Point is one of the most outstanding staging areas in eastern Canada for migrating waterfowl (Dennis and Chandler 1974). It is also a major stopover point for migrating passerines and a major summering area for gulls.

In the breeding season, Long Point supports a rich variety of waterbird species, as well as some species that are rare, threatened, or endangered in Ontario. It was one of the last recorded breeding locations in Ontario for the Piping Plover and it is one of the few areas in southern Ontario where the Bald Eagle may still nest. Long Point is also a breeding area for such rare species as King Rail, Forster's Tern, Prothonotary Warbler, and possibly Little Gull. On the adjacent mainland, the St. Williams Forestry Station has one of southern Ontario's few breeding colonies of Prairie Warblers (Goodwin 1977a) as well as a variety of species characteristic of more northerly regions, e.g. Red-breasted Nuthatch, Golden-crowned Kinglet, Hermit Thrush, Dark-eyed Junco. In fact, one of the most notable features of the Long Point area is the mixing of elements from southern and northern life zones.

The ecological integrity of this complex and fragile environment has survived largely through the efforts of the Long Point Company, a private hunting club that purchased the land at a government auction in 1866. In 1978–79, the Long Point Company donated about half (3249 ha) of its holdings to the Canadian Wildlife Service (CWS). That area is now protected as the Long Point National Wildlife Area (Fig. 1). Two sections of wetland at the base of the Point had previously been purchased by the CWS from other land-owners; those sections comprise the Big Creek National Wildlife Area. Other sections at the base of the Point are managed by the Ontario Ministry of Natural Resources (OMNR), the Long Point Region Conservation Authority (LPRCA), and private hunting clubs and cottagers. The Long Point Company has retained 3200 ha on Long Point as part of its waterfowl hunting operation. The easternmost portions of the Point are owned by the OMNR and Transport Canada. A lighthouse has been operated at the tip since 1830.

Long Point's history is rich and colourful (see Barrett 1977). Insights into the cultural development of the region as well as a historical perspective of the local fauna are provided by the journals of William Pope, a British naturalist and wildlife artist who spent much of his time in the Long Point district between 1834 and 1902 (Barrett 1968, 1976).

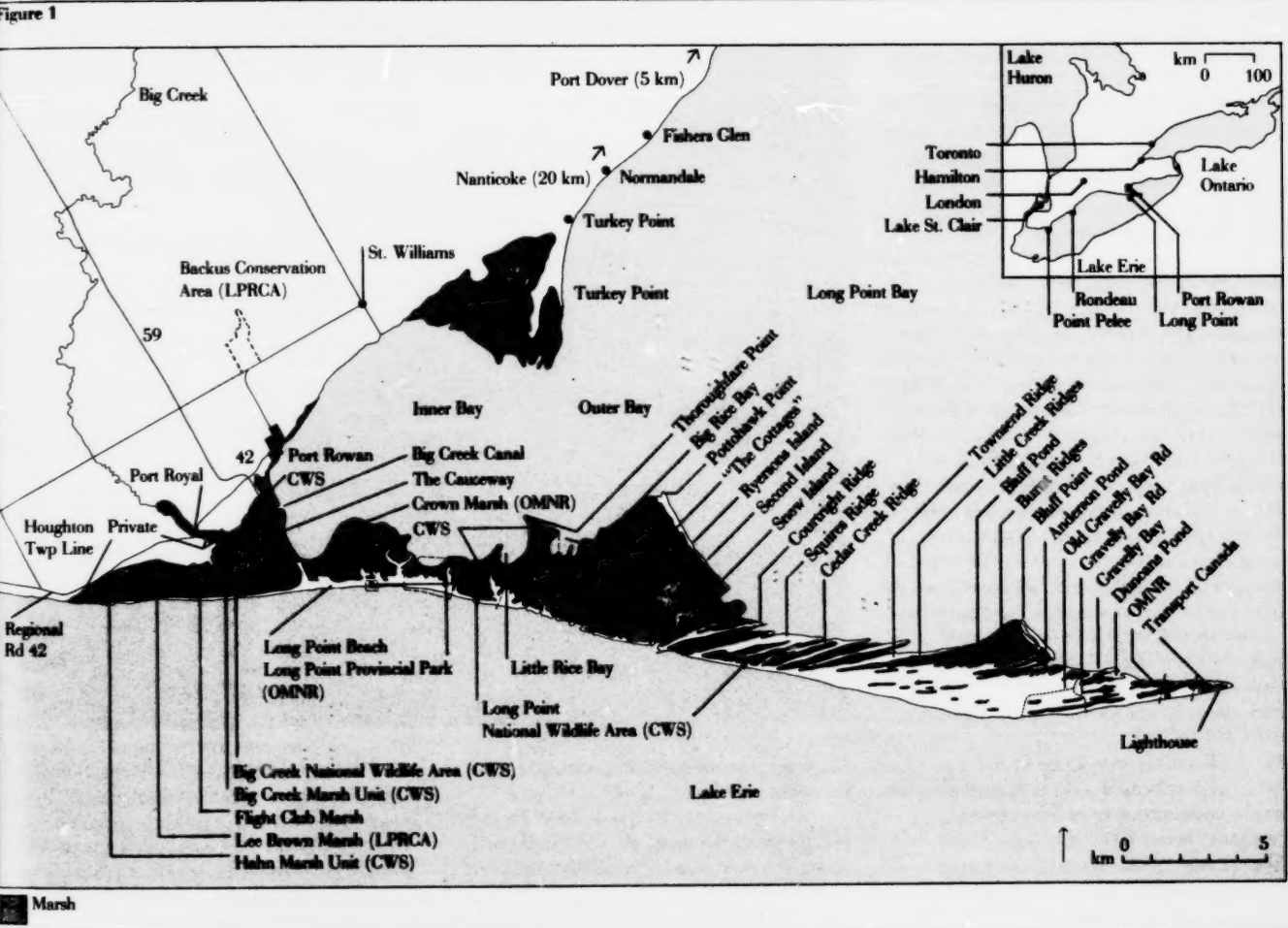
Macoun (1898) gave one of the first published accounts of the avifauna of Long Point, summarizing the observations of L.J. Boughner, who visited the Point in June 1898. In the early 20th century, the Point was visited by several other naturalists and biologists, notably W.E. Saunders of London, Ontario, and W.E.C. Todd of Pittsburgh, Pennsylvania. During the summer of 1927 and spring of 1928, the Royal Ontario Museum sent two expeditions to study the fauna of Long Point (Snyder and Logier 1931, Snyder 1931). The museum parties were based on Second Island and Courtright Ridge and most field work was conducted between the base of the Point and Squires Ridge. Sheppard (1935) later reported briefly on birds he encountered at Long Point in July

1933. Local naturalists, some of the more notable being M. Landon, J. McNally, G. North, and A.W. Preston, made additional contributions to knowledge of the avifauna.

The most intensive studies of Long Point began in 1960, following the establishment of bird-banding stations by the Long Point Bird Observatory (LPBO). Although the Observatory has taken part in a variety of biological studies, its basic program includes bird-banding, monitoring bird migration, and conducting breeding-bird censuses in representative habitats of Long Point.

In this report, we analyse the results of the breeding-bird censuses and relate these results to the vegetational succession. We also provide an annotated list of the breeding birds. Beginning with a consideration of the physical setting and climate of Long Point, we then describe the vegetational and avian communities. Botanical nomenclature follows Fernald (1950) and a list of scientific names of plants appears in Appendix 1. Common and scientific names of the bird species are provided in the annotated list and follow the American Ornithologists' Union Check-list (A.O.U. 1957) and its supplements (A.O.U. 1973, 1976).

Figure 1
Map of Long Point region



Study area

Loafing Ring-billed Gulls (photo: G. McKeating)

The influences of various physical processes, e.g. erosion and deposition, climate, and lake levels, have combined to create a remarkable landform in Lake Erie. Long Point is about 105 km² in area and 35 km in length, making it one of the largest sandspits on the Great Lakes. It has a rolling topography, with dunes rising to 20 m above lake level, alternating with interdunal slacks and wetlands. Extensive tracts of marsh have developed in the lee of the spit; the extent and productivity of these marshes is influenced by lake levels. The moisture regimes of interdunal slacks are also regulated by lake levels; they are wet or dry in years of high or low water, respectively. The dune ridges of Long Point run in a northeasterly direction from the south beach; the ridges toward the base of the Point are older than those toward the tip. The climax forest, typical of Rondeau, Point Pelee, and certain areas of the mainland of southwestern Ontario, is not well developed on Long Point, although a few trees of most species found in mainland forests occur on the spit. The more rigorous growing conditions (cooler summers, greater exposure to wind, and perhaps lower soil nutrient levels) of Long Point, relative to the other Lake Erie spits, may affect the composition of the forests.

1. Formation of Long Point

Long Point was formed by the deposition of sand carried by water currents, beginning about 4000 years ago (Wood 1951, 1960; Liard 1975). Wind-driven waves erode sand from the shoreline west of the spit and, through longshore drift, transport it to the Point.

The longshore currents in Lake Erie are a product of basin orientation and wind. The axis of Lake Erie is WSW-ENE and prevailing wind directions near Long Point are more or less along this axis. Therefore the net annual wave energy is from the WSW (Liard 1975). Because the south shore of Long Point runs generally east from its base, beach material is driven obliquely up the shore by waves from the WSW, while some material is drawn down again at right angles to the shore by backwash. Thus, over time, there is general

eastward movement of sand along the shoreline and the spit grows.

The eastern 10 km of Long Point is still growing; the tip of the Point advanced about 7 m per year between 1853 and 1945. Because it has grown into progressively deeper water, however, the rate of growth has decreased.

As the predominant northeastward longshore current passes the end of the spit, drag creates a westward countercurrent along the north shore. This countercurrent truncates the northeastern ends of old beach ridges, which had originally built up from the southwest. Weak counter-clockwise currents along the north shore of the Outer Bay deposit sand at Turkey Point. The infilling of the Inner Bay caused by sand deposition and siltation has helped to build extensive tracts of marshland in the lee of Long Point.



Because of its slender form, Long Point is especially susceptible to natural or man-induced changes in the patterns of erosion and deposition of sand. Even under completely natural conditions, repeated breaching of the neck of the spit is likely to transform an ever-increasing section of the Point into a marshy tract in which few, if any, traces of the original beach structure will remain.

2. Climate

The climate of Long Point is, in many ways, similar to that of many other localities in the Great Lakes; however, its presence in Lake Erie, the southernmost and shallowest of the Great Lakes, is of particular significance. Unless otherwise cited, most of the following material is taken from Phillips and McCulloch (1972) and Brown *et al.* (1974).

Figure 2

Seasonal variations in air temperature for the Long Point lighthouse and for St. Williams on the nearby mainland.
Source: Environment Canada 1973

The mean July temperature at Long Point is about 21°C (Fig. 2). Owing to the moderating influence of Lake Erie, the mean annual frost-free period is quite long, about 200 days. There is little seasonal variation in precipitation and mean annual precipitation (about 86 cm) is average for southern Ontario. The prevailing winds are south-westerly.

The Lake Erie region is noted for rapid changes in weather conditions and for frequent and intense storms. Storms result in erosion of shoreline areas, breakup of marsh vegetation, and windthrow and windbreak of trees. Another effect brought on by strong winds is "set-up", the piling of water at the downwind end of a lake.

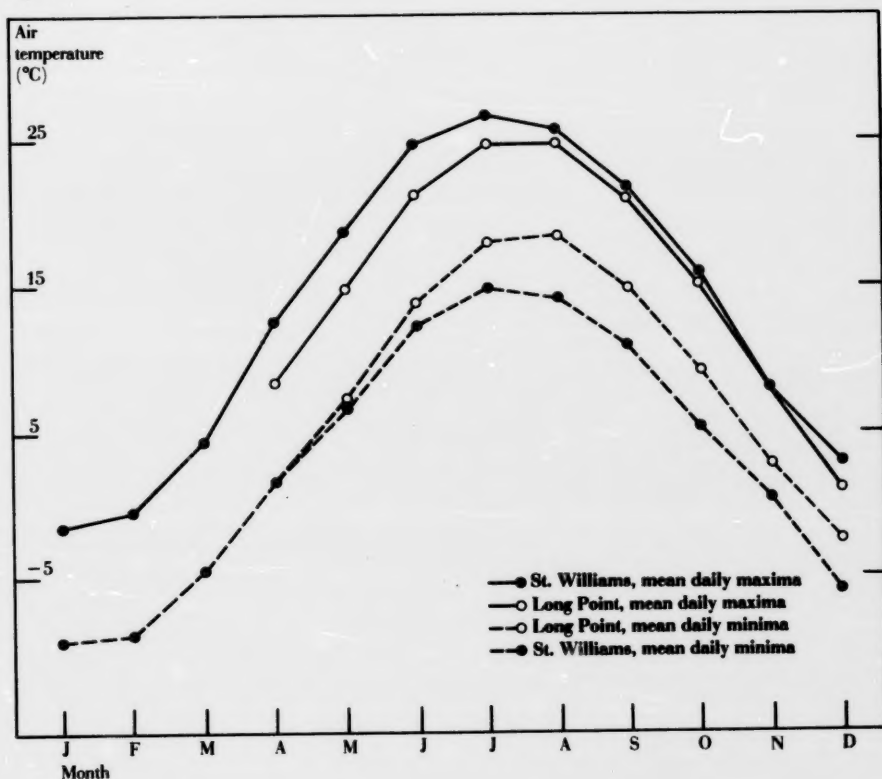
3. Lake levels

Long-term, seasonal, and short-term water level fluctuations occur on Lake Erie and the other Great Lakes. Long-term fluctuations are the direct result of several years of either excessive or deficient precipitation within the Great Lakes watershed. Because periods of high and low precipitation vary in length, high and low water levels do not occur in regular cycles. Seasonal fluctuations in water level are also caused by variations in water supply. Long-term fluctuations in the level of Lake Erie are about 2 m (Anon. 1976). Seasonal variation around mean values is about 0.5 m.

The most dramatic changes in Lake Erie water levels are the short-term fluctuations caused by strong winds and by large, rapid changes in barometric pressure (Gillies 1958, Hunt 1958, Richards 1965). Lake Erie is particularly susceptible to the effects of strong winds for two reasons: the lake is quite shallow (over 90% is less than 25 m deep), and the long axis of the lake basin coincides with the direction of the prevailing winds.

The erosion-deposition process is markedly affected by water level fluctuations. The combined effects of record-high lake levels in the early 1970s, wind set-up, and wave energy have resulted in very significant erosion along the whole length of the Point. This erosion has been particularly severe west of Squires Ridge on the Point's south shore.

Figure 2



4. Dune habitats

Sand dune habitat is characterized by extreme variations in conditions of dryness and temperature. The tops of the dunes are very dry, while only a few metres away there is often an "oasis" of open water in the interdune slack. At Long Point, tracts of uniform habitat are restricted to narrow zones paralleling the dune ridges.

The vegetation communities of Long Point have been described and mapped by Heffernan (1978) and Heffernan and Ralph (1978). The following accounts are based primarily on those studies and serve as an introduction to the more detailed vegetation accounts of the breeding-bird census plots.

4.1. Beach

The south beach of Long Point is typically much wider than that of the north shore.

Some sections of the south beach between the Provincial Park and Squires Ridge have been breached and there are inlets between the lake and the marshes of the Inner Bay. Temporary beach ponds occur along the south shore. The widest beaches generally have three zones: (1) a bare sandy or pebbled area adjacent to the water, (2) a swath of grass, and (3) a sandy ridge with eastern cottonwoods. The north beach is often marshy, particularly in places sheltered by dune ridges or sand bars.



4.2. Savannahs

Savannahs are defined as plant communities having scattered trees and a canopy cover of 10–50%. On Long Point, the dominant vegetation communities on the dry dune ridges are savannahs of various tree composition. Savannahs on young dunes are dominated by pioneer species such as eastern cottonwood and red cedar, with an understory of switch grass, little bluestem, and Indian grass. Savannahs on the older ridges are generally dominated by mature deciduous trees with an understory of Canada bluegrass and Kentucky bluegrass. There is virtually no tree regeneration on the older dunes.

4.3. Forests

Two types of forests can be recognized on Long Point: upland dry forests and lowland swamp forests. The two main upland forest communities are composed of white pine – white cedar and red oak – sugar maple. Regeneration in these areas is minimal and there is little shrub cover. These forests merge with savannah communities of similar tree

species. Lowland forests usually occur as narrow ridges of trees intermixed with marsh and open water. The most extensive areas of lowland forests are the tamarack sloughs, dominated by tamarack, white cedar, white pine, and white birch. Many of the trees in these sloughs have been killed by fires or by prolonged periods of high water.

4.4. Interdunal aquatic communities

Small areas of open water and marsh occur throughout the savannah and forest communities. The shallow interdunal areas are ponds during periods of high lake levels, and damp meadows at other times. Areas of standing water between the dunes frequently contain a shrub carr community composed mainly of buttonbush and loosestrife. The wet areas in young dunes are typically swales of sedges and rushes. The marshy areas in the older dunes are generally characterized by hummocks of sedge (*Carex stricta*) and bluejoint grass, often fringed by tamarack.

4.5. Disturbed areas

Disturbed areas are communities that have obviously been influenced by man or fire and include cottage developments, recreational areas (parks), tree plantations, logged and burnt-over areas. The largest areas disturbed by man are at the base of the Point (the Provincial Park and cottage community). Vegetation in these areas is mainly cottonwood and red cedar: evergreen plantations are scattered throughout. Farther east on Long Point, human disturbance has been minimal and generally consists of trampled areas around buildings and a few small plantations. Various logged areas have subsequently been burnt, and it is difficult to determine the exact extent of the logging (Heffernan 1978). Heffernan notes that some results of logging on Long Point have been an apparent reduction in the abundance of some tree species (red oak, white pine, white cedar, red cedar, and black walnut) and the construction of a few jeep trails. She also notes that very little logging has occurred in the past 50 years, and none since 1951.

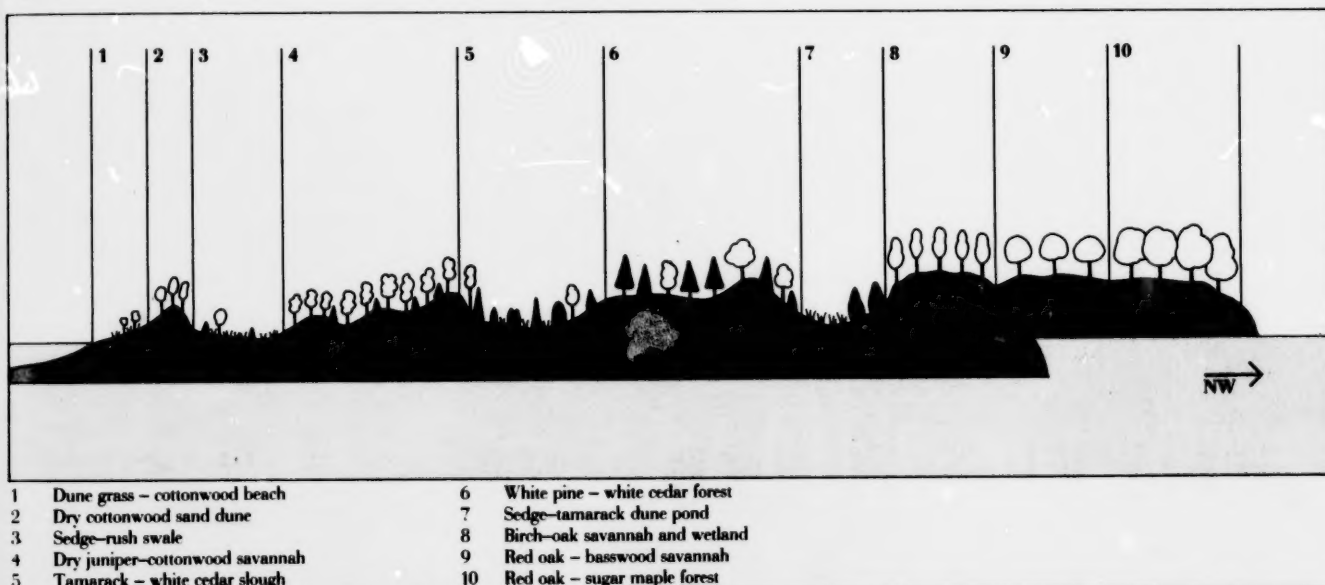
Heffernan documented some of the fires on Long Point and notes that they have played a significant role in shaping the vegetation. Evidence of fire damage can be seen in various areas and some ridges and interdunal areas have been virtually denuded of trees. These burnt areas have minimal canopy covers and are dominated by grasses. Regeneration of tree growth is slight.

5. Succession of vegetation communities in dune habitats

Haylock *et al.* (1970) made a preliminary study of the succession of the sand dune system near the eastern end of Long Point and identified several floral stages in community development. Subsequently, the LPBO established breeding-bird census plots in each of the major successional stages and analysed the flora of each in detail. The following general description of vegetation succession in dune habitats is taken largely from Haylock *et al.* (1970), the bird observatory's surveys, and studies by Olson (1958) and Sparling (1965) on dune systems along

Figure 3
Generalized profile of plant succession in dune habitats at Long Point (after Haylock *et al.* 1970). Numbers refer to successional stages or zones

Figure 3



Lake Michigan and Lake Huron, respectively. A general profile of plant succession in the dune systems of Long Point is given in Figure 3.

Because succession begins when the beach is colonized by pioneer species and develops through several distinct stages as the beach and dune system build outward from the shore, the sequence of successional stages can best be described by starting at the present-day beach and moving inland (north-west). The first stage is represented by the beach (Zone 1, Fig. 3), which is colonized by pioneer plants and dune-building grasses, particularly dune grass. The embryo dunes are then colonized by eastern cottonwood. In Zone 2 the sand is still not fully stabilized and ground cover is sparse. Behind the foredune there is usually a low interdunal area (Zone 3) which is often wet. Ground cover is more varied and more dense in this zone and ground juniper and red cedar occur. A dune complex (Zone 4) arises behind the first interdunal area. Red cedar and cottonwood are common and the surface is well covered by

vegetation; ground juniper and grasses dominate the understory. Sand movement is reduced and the dune surface is more stabilized, permitting the entry of many more plant species. From the dune complex, the land slopes into the second wet interdune (Zone 5), consisting of marshes and tamarack sloughs. From the third dune ridge (Zone 6), dominated by white cedar and pine, there is a third interdune (Zone 7), after which the land becomes gently undulating. The surface is well covered with vegetation and there is little sand movement (Zone 8). Canopy cover increases, and a mature deciduous woodland dominated by red oak and sugar maple develops on the oldest ridges (Zones 9 and 10).

6. Succession of the marshes

The marshes in the lee of Long Point are of two basic types: the deep water cattail marshes of the Inner Bay, and the shallow water grassy marshes characteristic of the Big Creek delta at the base of the Point. Other grassy marshes and wet meadows occur in the interdunal areas and in the ponds and bays

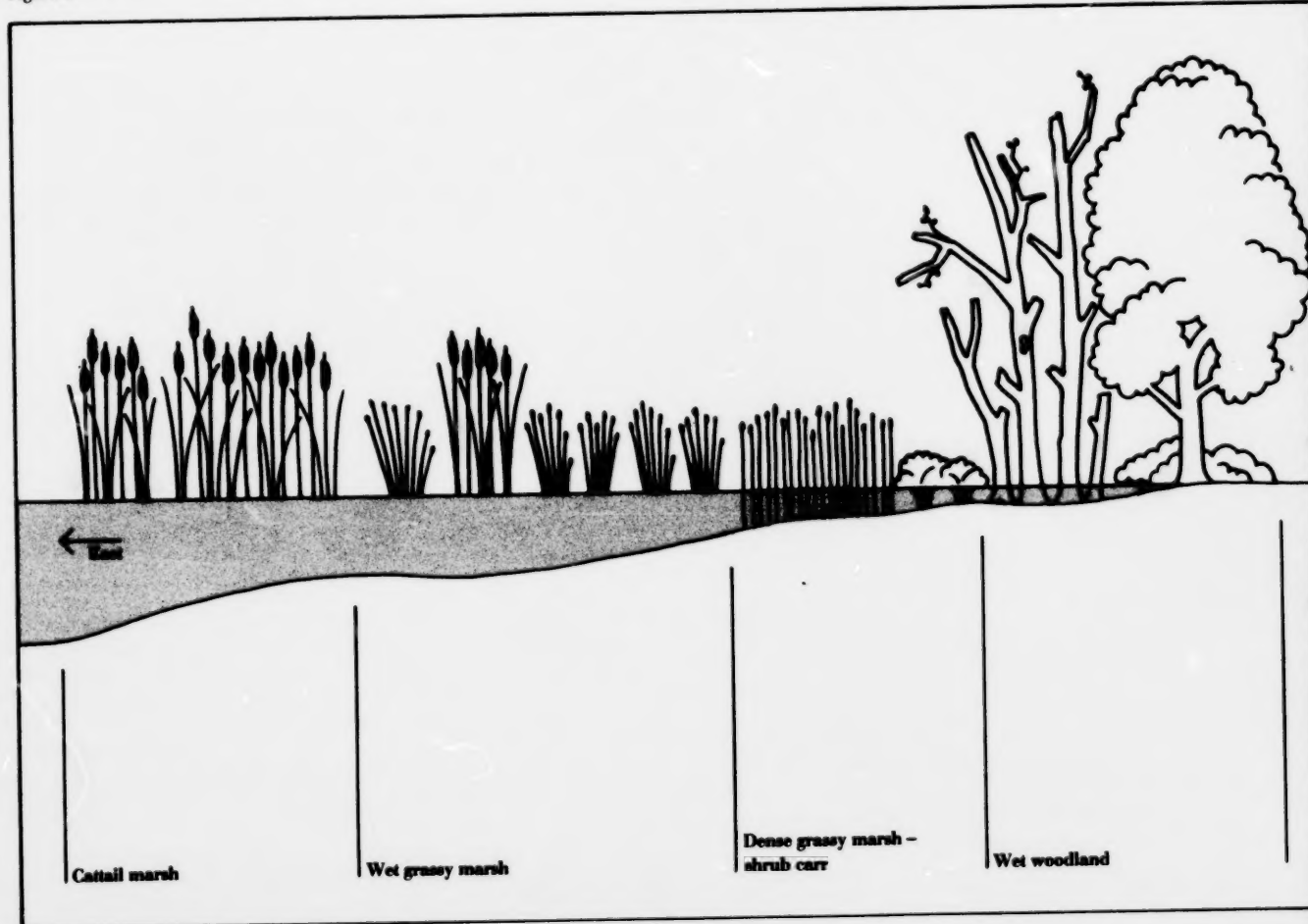
between some of the ridges of Long Point.

In a completely closed system, a marsh will gradually silt-up and progress through a series of successional stages from open water to solid ground. The processes underlying this successional pattern have been broadly described by Sparling (1979). Following the colonization of the open water areas by floating and rooted aquatic plants, four basic stages may be recognized in the succession of the marshes of the Big Creek delta (Fig. 4). From east to west (youth to maturity), these are cattail marsh, wet grassy marsh, dense grassy marsh - shrub carr, and wet woodland. It should be noted that we have limited our study to the typical patterns of delta marsh succession as outlined above. A somewhat different successional development occurs in other marsh areas on Long Point; however, these are related to the succession of dune systems and are not dealt with here.

Succession of aquatic habitats is often complicated by factors that may speed up, arrest, or reverse the normal trend of community development. The deep water cattail

Figure 4
Generalized profile of plant succession in delta marsh
habitats at the base of Long Point (looking south)

Figure 4



marshes of Long Point are maintained at an early successional stage by seasonal and yearly fluctuations in water levels in a process that Odum (1971) has termed "pulse stability".

6.1. Cattail marshes in the Inner Bay

Cattail dominates the deep water marshes of the Inner Bay. Succession in these marshes has been impeded by fire, seasonal fluctuations in water level, storm damage, the deposition of sand from the overwash of Lake Erie across the barrier beach at the neck of the Point, and ice-scouring during spring breakup (Ralph and Heffernan 1978, Bayly 1979).

Munroe (1965) studied the vegetation of the Long Point Company Marsh and found that cattail accounts for about 75% of the vegetation. Burreed and reed grass are common and occasionally occur in small monodominant stands. Soft-stem bulrush occupies areas of deep water at the edges of the marsh. Arrowhead occurs mixed with other emergents or in pure stands.

Farther west towards the mouth of Big Creek lie the cattail marshes of the Crown Marsh. Bayly (1977) found that although a large number of plant species occur in this marsh, the dominant plants are hybrid cattail (*Typha glauca*) and its introgressive (back-cross) hybrids. *T. glauca* has recently arisen as a result of hybridization between *T. latifolia* and *T. angustifolia*. The hybrid vigour of the new species and its many backcrosses enables the plant to succeed in many water depths and conditions (Bayly 1977). The only other large emergent in the Crown Marsh is reed grass.

6.2. Wet grassy marsh to wet woodland (Big Creek marshes)

In 1928, a causeway was constructed across the Big Creek marshes to join the mainland with Long Point. The construction of the causeway has almost certainly hastened the successional process, because it effectively closed off these marshes from the water level fluctuations of the Inner Bay. However, high water levels and the storms of Lake Erie still result in periodic influxes of lake water and sand into the marshes. Also, the northeastern



portions of the marshes are susceptible to spring flooding from Big Creek. Various small-scale water level management activities have probably also impeded the rate of succession in the Big Creek marshes.

The vegetation of the wet grassy marsh stage in the Big Creek Marsh Unit of the Big Creek National Wildlife Area was described by Ralph and Heffernan (1979). Bluejoint grass dominates this stage, occurring either in monodominant stands or as a co-dominant with water sedge or swamp loosestrife. Areas containing bluejoint range from being almost completely dry to having up to half a metre of water. In deeper water, bluejoint is usually limited to scattered tussocks. When it is mixed with loosestrife, bluejoint uses the rooted loosestrife hummocks to enable it to root in deeper waters. Loosestrife often dominates the edges of ponds and channels but bluejoint - water sedge is a more typical community in slightly shallower areas. Small stands of cattail are found scattered throughout the Big Creek Marsh Unit. Hybrid cattail is the dominant species and it grows in a variety of water levels. Large pure stands of burreed occur in only a few locations in this marsh, but it is widespread as a sub-dominant species. Reed grass is found in small scattered monodominant stands throughout the marsh. About one half of this marsh is open water in

the form of channels, small pools, and large ponds.

Farther west, the marshes of the Big Creek delta become progressively drier and more densely covered with bluejoint. In the dense grassy marsh stage of the Hahn Marsh Unit, this species is dominant over much of the area. There are no large stands of water sedge, but it does occur as a co-dominant with bluejoint over part of the marsh. Only a few areas are dominated by cattail, reed grass, and loosestrife. Areas of open water are restricted to a few small shallow ponds and channels.

The western edge of the dense grassy marsh is characterized by a narrow shrubby transitional zone that succeeds into the adjacent wet woodland. Speckled alder is the dominant shrub in this transitional habitat. Recent flooding has killed many of the shrubs, and this again demonstrates how succession can be impeded by high lake levels. The herbaceous understory consists mainly of burreed, bluejoint, cattail, and rice cutgrass.

The western edge of the shrub carr merges into a wet woodland (the Hahn Woods). Recent flooding and storms have killed many of the trees in this silver maple swamp. Buttonbush thickets occur in the more open areas; speckled alder and dogwood are scattered throughout.

Methods

We have separated the vegetation and breeding-bird communities of Long Point into two major types — those associated with the succession of dune habitats on the Point, and those associated with the succession of marsh habitats in the lee of the peninsula. This division follows the two major patterns of succession associated with the formation of the Point. Slightly different methods were used to sample the bird and vegetation communities of the dune and marsh habitats.

Our study covers the results from 30 breeding-bird censuses in 14 representative dune habitats on Long Point. Ten censuses were also conducted in six marsh study areas. Figure 5 (inside front cover) shows the locations of the study areas, and Table 1 lists the sizes of the census plots and the sources of information.

1. Habitat studies

1.1. Dune habitats

Quantitative estimates of the vegetation in census plots in dune habitats followed one of two methods outlined by James and Shugart (1979) — the *point quarter method* (plotless) and an *areal sampling method* (circular plots).

The quarter method is based on the principle that the average area occupied by each tree is the reciprocal of the density of the trees. Transects were made through the census plots and at least 20 points were sampled along the course of each transect. The species and diameter at breast height (DBH) of the nearest tree in each 90° sector from a given point were recorded and the distances from the point measured. Thus, four trees were sampled at each point. The sum of the distances divided by the number of trees gave the average distance between trees. An estimate of the density of trees per hectare was then calculated by dividing the area (in square metres) by the square of the average distance between trees. We determined basal area or dominance (an estimate of woody biomass) from the same data. The basal area of an individual tree is the cross-sectional area of the trunk measured at breast height (about 1.4 m

Table 1
List of breeding-bird census studies conducted at Long Point

Census plots	Plot size (ha)	Years surveyed	Sources
Dune habitats			
Dune grass – cottonwood beach	12.10	2	Bernstein <i>et al.</i> 1974; Hurst <i>et al.</i> 1979b
Dry cottonwood sand dune	10.52	2	Evans and Nakashima 1973a; Moses <i>et al.</i> 1974a
Sedge–rush swale	10.32	2	Nakashima 1973a; Moses <i>et al.</i> 1974c
Intergrading dune–swale–savannah*	19.51	5	Cobus <i>et al.</i> 1965; Page <i>et al.</i> 1967; Whittam <i>et al.</i> 1968; Bradstreet and Page 1969; Fairfield 1969
Dry juniper–cottonwood savannah	8.30	2	Evans 1973b; Moses <i>et al.</i> 1974b
Tamarack – white cedar slough	6.07	3	Nakashima 1973b; Miller 1974; McCracken 1975a
White pine – white cedar forest	4.00	3	Evans 1973a; Schugar <i>et al.</i> 1974a; McCracken 1975b
Sedge–tamarack dune pond	9.66	1	Hurst <i>et al.</i> 1979c
Birch–oak savannah and wetland	5.85	2	Hurst <i>et al.</i> 1979a; Verburg and Skevington 1981
Red oak – basswood savannah	7.50	1	Verburg 1980a
Red oak – sugar maple savannah	7.50	1	Verburg 1980b
Red oak – sugar maple forest	6.88	2	Johnston and Fearis 1973; Cartar <i>et al.</i> 1975
Recreational dune area	8.55	2	Evans 1974; Goodlet <i>et al.</i> 1974
Bluegrass–milkweed grassland	6.68	2	Evans and Nakashima 1973b; Schugar <i>et al.</i> 1974b
Marsh habitats			
Cattail marsh	2.76	1	Dunn and Nol 1977
Wet grassy marsh (three plots)	3 × 10.00	1–2	McCracken 1978, 1979
Dense grassy marsh – shrub carr	5.50	2	McCracken 1978, 1979
Wet woodland (silver maple swamp)	6.50	2	McCracken 1978, 1979

* For the purposes of this report, this census plot has been renamed: it was originally known as "sand dunes with scattered cottonwoods".

from the ground).

The habitats of most census areas were determined using the areal sampling method. At least five circles of 0.04 ha were sampled by recording species and diameters of all trees within 11.28 m (the radius of the circles) of a randomly selected point.

In both methods, we defined trees as woody plants with a DBH of 7.5 cm or more. Size classes were as follows (DBH, in cm): 7.5–15, 15–23, 23–38, 38–53, 53–68, 68–83, 83–100, and 100+. Dead trees were also counted and measured. Tree species were ordered by relative density; those that made up at least 90% of the total tree density were classified as "common trees".

Percentages of canopy and ground cover were determined from vertical sightings through an ocular tube. Canopy height was estimated by a triangulation technique recommended by James and Shugart (1970).

Species comprising the ground cover were identified and their frequencies of occurrence noted.

1.2. Marsh habitats

"Plant cover" is defined as the percentage of the surface area covered as determined by areal projection of aerial parts. In the Big Creek marshes, each census plot was subdivided into 50 × 50 m sections, and the percentage of each section covered by each type of emergent vegetation was estimated. Ten water-depth recordings were randomly taken in each 50 m interval and the percentage of open water was also estimated (McCracken 1978, 1979). A similar approach was used by Dunn and Nol (1977) in the description of the cattail marsh plot.

The habitat of the wet woodland plot in the Hahn Woods was determined by using a modification of one of the areal sampling



methods described by James and Shugart (1970). A 650 m long transect was cruised and observations were made for each 50 m interval. Each sampling unit was a swath 2×50 m (0.01 ha). Within each unit, all trees were identified and grouped according to their size classes (DBHs). Percentages of canopy and ground cover were estimated by the ocular tube method described above.

1.3. Data analysis

Succession was apparently simpler in marsh habitats than in dune habitats. Marsh succession passed through four definable stages from cattail marsh to wet woodland, whereas dune succession passed through 10 definable stages from sand beach to oak-maple forest. We grouped some of the successional stages in dune habitats to obtain a simpler scheme. As a guide for this grouping process, we determined the similarity of various successional zones using Pianka's (1967) formula:

$$\text{Similarity index} = \frac{\sum P_{1i}^2 \sum P_{2i}^2}{\sqrt{\sum P_{1i}^2 \sum P_{2i}^2}}$$

where P_i is the proportion of the stem density that is tree species i . We subjected the similarity matrix to cluster analysis and prepared a dendrogram.

2. Breeding-bird censuses

2.1. Dune plots

Our study covered 14 habitats on Long Point, and included dry (dune) and wet (interdune) areas. Thirteen of these plots covered succession from open, unvegetated beach to oak-maple forest. We based site selection on the plant community descriptions of Haylock *et al.* (1970), Heffernan (1978), and our personal knowledge of Long Point. Three of the 13 study areas were in disturbed habitats: a burnt dune, a burnt interdune, and a recreational area (Fig. 5). The 14th study area (intergrading dune-swale-

savannah) was a mixture of three successional zones (Fairfield 1969).

Census plots varied in size from 4 to 19.5 ha; the smaller plots were usually located in discontinuous or restricted habitats. Censuses spanned the years 1965–1980. During each year of census, each plot was visited from 8 to 13 times in late May, June, and early July. Almost all visits were made in the early morning or early evening hours. Bird territories were mapped using the Williams Spot-Mapping Method (Hall 1964) and care was taken to separate breeding birds, i.e. those holding territories, from regular or casual visitors to the plot. Breeding-bird densities were expressed as number of territorial males/km².

2.2. Marsh plots

Relatively few breeding-bird studies have been conducted in marsh habitats and no totally acceptable census method has been developed. The territory-mapping method, following the guidelines of the International Bird Census Committee (1970), was used as a basis for censusing the marshes at Long Point. These guidelines, however, are not entirely suitable for the census of marsh birds (Bell *et al.* 1973, Dyrce and Tomilovic 1974, Erskine 1974, Jensen 1974). Specific territorial conditions and the composition of the bird communities required the standard territory-mapping method to be modified slightly. In the Big Creek marshes, McCracken's (1978, 1979) method was similar to one developed by Dyrce and Tomilovic (1974). Breeding territories of passerines were delineated using standard methods based on observations of singing adults, but considerable emphasis was also placed on observations of adults with food, of adults displaying alarm, and of recently fledged young. Particular effort was devoted to finding as many nests as possible. The best method for waterbirds appeared to be registration of restless or displaying birds, together with finding nests. Because Long-billed Marsh Wrens build many "dummy" nests, empty nests belonging to this species were not included. Dunn and Nol's (1977) census technique in the cattail marsh plot was

based solely on finding nests.

Our study included six census plots, ranging in size from 2.8 to 10 ha. Each plot was censused at least seven times during the period 18 May – 6 July. Breeding-bird densities were expressed as number of territorial males/km² or, in the case of polygynous species (Redwinged Blackbird, Long-billed Marsh Wren), territorial females/km².

2.3. Data analysis

Estimates of bird species diversity were derived from the Shannon-Weaver information formula $\bar{H} = -\sum_{i=1}^s p_i \log_e p_i$ where p_i = the relative abundance of the i th species and s = the number of species in the group (Shannon and Weaver 1963). The ($\bar{H}$ measure actually has two separate components, species richness and the equitability or evenness of species abundances (Lloyd and Chelardi 1964). Species richness is the number of species; equitability is a measure of how the individuals are apportioned among the species.

We used Pielou's (1966) index of equitability

$$J' = \frac{\bar{H}}{\log_e s}$$

where $\bar{H}$ is the Shannon index and s is the number of species. This index represents the ratio of the observed diversity ($\bar{H}$) to the maximum diversity possible for the same number of species. It has a maximum value of 1.0 when all species are equally abundant. A minimum value is obtained when all species, except the most abundant, are represented by only one individual (Tramer 1969). Thus, the equitability index varies inversely with measures of species dominance.

Measures of population density, species diversity, and equitability are influenced by sample sizes. In small plots, species richness tends to be underestimated, while densities may be inflated (Odum 1950, 1971; Oelke 1966, Linehan 1968, Tramer 1974). Because the areas and bird populations sampled were of different sizes in each seral stage, it is

difficult to determine to what extent changes in diversity and density reflect successional patterns of the habitat and to what extent they result from sampling artifacts. Additional complicating factors undoubtedly affect the results. For example, the presence of semi-colonial species in some study areas and the relative amount of "edge" in each study plot introduce biases. For the time being, we assume that trends in diversity and density reflect the patterns of succession; nevertheless, we recognize the limitations of the study.

Finally, we attempt to estimate the total Long Point populations of species nesting in the dune plots. We assigned dune plots to various generalized habitats (as defined by Heffernan 1978, her Fig. 18), and determined the areas of these habitats by planimetry. Each habitat area was multiplied by the density of each species on plots in that habitat to yield an estimate of population size. Marshes and late successional interdune ponds (those west of the sedge-tamarack dune pond census plot) were not included in the analysis; more data are needed on the avifauna of these areas before even general population estimates can be made.

2.4. Additional data sources

In addition to breeding-bird censuses and various thesis studies, we examined all other published references to Long Point. We also examined a number of unpublished sources, including LPBO daily logs, banding records, and reports; nest record cards filed in the Ontario Nest Records Scheme at the Royal Ontario Museum; and a variety of diaries, notes, and letters. The diaries of J.L. Baillie and L.L. Snyder provided information and insights into the expeditions of the Royal Ontario Museum in 1927 and 1928. Mrs. J.L. Baillie permitted the use of her husband's diary through the Fisher Rare Book Library of the University of Toronto. Mrs. L.L. Snyder kindly permitted the use of her husband's diary through M.S.W. Bradstreet. We consulted the letters of M. Landon (13 December 1936) and J. McNally (18 Decem-

ber 1938) to J.L. Baillie, which are available in the Baillie Collection of the Fisher Rare Book Library. We inspected other pertinent material in the Department of Ornithology, Royal Ontario Museum, including A.W. Preston's notes on the birds of the Port Dover area and W.E.C. Todd's report of his visit to Long Point in July 1907. We also searched unpublished reports and notes of the CWS, OMNR, LPRCA, and Long Point Company, and consulted records from a number of naturalists and biologists (see Acknowledgements).

Results and discussion

1. Description of the breeding-bird census plots in dune habitats

Based on the census plots, we recognize 10 zones or stages in the succession of dune habitats (Fig. 3). Table 2 shows the distribution of the common tree species in each of these zones. Other features of the vegetation are summarized in Figure 6. The intergrading dune-swale-savannah census plot does not appear in Table 2 or Figures 3 or 6 because its vegetation was not described quantitatively and because it is a mixture of dry cottonwood and dune (Zone 2), sedge-rush swale (Zone 3), and dry juniper-cottonwood savannah (Zone 4). Nevertheless, we give a descriptive summary of the vegetation on this plot. Also, results from the two census plots in the red oak - basswood savannah stage (Zone 9) were pooled in the analysis. It should be noted that the birch-oak savannah and wetland (Zone 8) may not necessarily succeed to the red oak - sugar maple climax forest (Zone 10). The successional sequence from the sedge-tamarack dune pond stage (Zone 7) may proceed to the birch-oak savannah (Zone 8), or it may proceed via the red oak - basswood savannah stage (Zone 9) to the red oak - sugar maple climax forest (Zone 10). This branching of the successional sequence is indicated in Figure 3 by showing a division of the ridges.

We studied three disturbed habitats. Two are dealt with separately (section 1.12) because the natural course of primary succession was interrupted or modified. The third, the sedge-tamarack dune pond in Zone 7, previously had been burnt and yet, in many respects, had vegetation similar to other third-order dunal areas. For this reason, Zone 7 is included in this section but is treated as a special case in the section on avian communities and plant succession (section 6).

Quantitative aspects of the development of the vegetation communities in the census plots are summarized in Figure 6. Because there are actually two types of succession or seres in the dune systems (the succession of upland dunal and lowland dunal communities), some of the trends masked and further research is required before the patterns of succession are fully

Table 2

Distribution of the common tree species in the succession of dune habitats at Long Point*

Tree species	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10
Eastern cottonwood	146	138	15	10						
Red cedar				44	+					
White cedar					101	138	5	+		
Tamarack					62	20	128			
White birch					54			86		
White pine					27	64		+		
Red ash						10		+		
Red maple							10	5		5
White ash							5	7	2	5
Silver maple							+	7		
Red oak							+	32	25	94
Sassafras								12		
Hop hornbeam								7	7	
Yellow oak								5		
Basswood									10	
Buttonbush									7	
Sugar maple									7	54
Choke cherry									5	
White oak									2	7

* Figures represent the number of trees per hectare. Trees present in low numbers are indicated by "+". Successional zones are defined in Figure 3.

understood. Nevertheless, Figure 6 demonstrates that the number of common tree species, mean canopy height, percentage canopy and ground covers, tree density, and total basal area of the trees tend to be higher in the later seral stages than in the earlier ones.

1.1. Dune grass - cottonwood beach plot (Zone 1)

The south beach is composed of three bands of different vegetational types. The southernmost strip is the sandy, pebbled shore of Lake Erie, which is almost without vegetation. North of this is a swath of grass, which is in turn bounded on the north by a sandy ridge of eastern cottonwoods. Falls (1953) analysed the vegetation in the grass swath of this zone and noted that dune grass, switch grass, and bluestem beard grass were the most common species.

Eastern cottonwood was the only tree species present (Bernstein *et al.* 1974). Although trees occurred at a density of 146 per

hectare in this zone, the total cross-sectional basal area was small (Fig. 6), indicating the youthful nature of this community. All trees had a DBH of 8-15 cm. Ground cover averaged 10%.

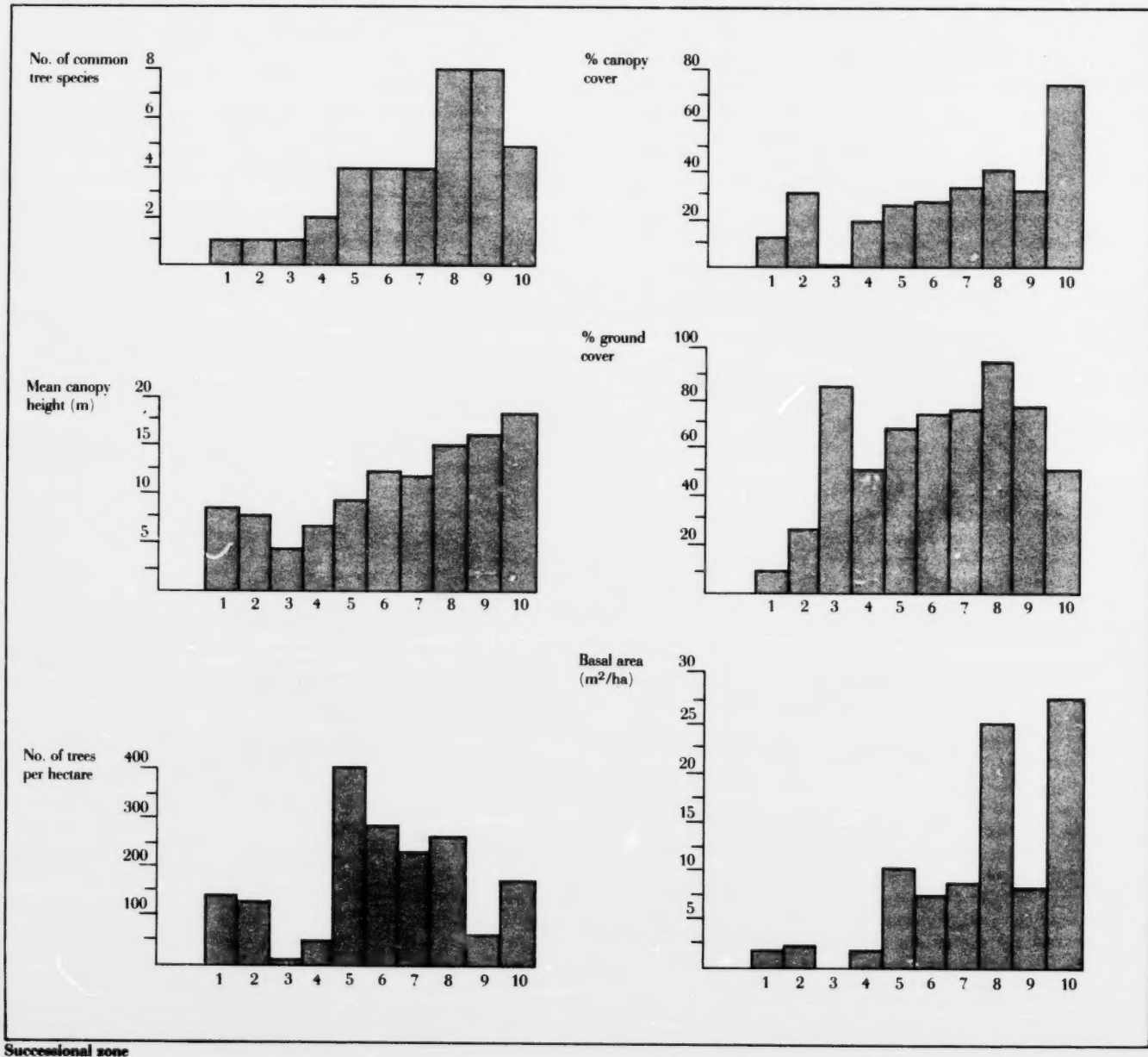
1.2. Dry cottonwood sand dune plot (Zone 2)

This zone is actually a continuation of the swath of cottonwoods in the previous zone to the crest of the first dune. Although the density of trees in this stage was similar to that of the beach zone, 33% of the cottonwoods on the dune crest had a DBH of more than 15 cm. Together with the increased canopy cover, ground cover, sand basal area of trees (Fig. 6), this indicates a somewhat older successional community. The most prominent herbs in this zone were dune grass, switch grass, sand dropseed, little bluestem, milkweed, and wormwood (Evans and Nakashima 1973a).

Figure 6

Summary of vegetational characteristics for various stages in the succession of dune habitats on Long Point. For description of zones, see Figure 3

Figure 6



Successional zone



1.3. Sedge-rush swale plot (Zone 3)

A pond, up to 1.5 m deep and 135 m wide, depending on lake levels, lay in the centre of this plot. The only canopy tree species was eastern cottonwood. Red cedar made its first appearance in this zone, but as a member of the understory. Tree density, percentage canopy cover, and basal area of trees were all lower than in any of the other zones, but percentage ground cover was high (85%, Fig. 6). Most prominent in the ground cover were Baltic rush, elliptical spikerush, variegated horsetail, grass-of-parnassus, alpine rush, sneezeweed, yellow flax, and bladderwort (Nakashima 1973a).

1.4. Intergrading dune-swale-savannah plot (mixture of Zones 2, 3, and 4)

This was an area of rolling sand dunes interspersed with damp and grassy low areas. The vegetation of this plot was not quantitatively sampled by the standard methods of James and Shugart (1970). Description of the plot is taken from Cobus *et al.* (1965). It supported a sparse growth of eastern cottonwoods up to 20 cm DBH and about 6 m high, and a few red cedars of the same size. There was an average of 20 trees per hectare. Ground juniper was the only common shrub. About 20% of the ground was bare sand. The ground cover consisted of grasses, rushes, mullein, Kalm's lobelia, St. John's-wort, beach pea, scarlet painted cup, puccoon, bearberry, wormwood, and horsetail.

1.5. Dry juniper-cottonwood savannah plot (Zone 4)

This area consisted of complex rolling sand dunes up to 6 m above lake level, interspersed with flatter areas. The tree canopy was 82% red cedar and 18% cottonwood, the former increasing in height towards the northern end of the complex. The large size of some of the trees (15% with DBH over 23 cm) suggests that this dune community is older than the community on the first dune, where only 1% of the trees had a DBH of over 23 cm. Tree density was lower in Zone 4 (54 per hectare) than on the first dune (138 per hectare), and the ground cover was denser;

this indicates the open, savannah-like nature of this habitat, unlike that of the first dune (Fig. 6). Most prominent in the ground cover were Canada bluegrass, rock cress, sand dropseed, little bluestem, bearberry, ground juniper, milkweed, switch grass, gray goldenrod, Indian grass, red cedar, Canada wild rye, puccoon, Russian thistle, and dune grass (Evans 1973b).

1.6. Tamarack – white cedar slough plot (Zone 5)

Northward from the dune complex the land was less elevated and comprised the second wet interdune. This consisted of a long, narrow band of marsh and open water containing forested areas north and south of the slough. Both the forest and the open water contained many dead trees (32% of all trees), probably caused by record-high lake levels and extensive flooding in recent years. There were four main tree species in the canopy; white cedar (25%), tamarack (15%), white birch (14%), and white pine (7%). Mean canopy height and total basal area were greater than in the preceding zones (Fig. 6). The slough also contained a greater tree density than any other area surveyed. The ground cover was dominated by bluejoint grass, water sedge, ground juniper, marsh fern, great bladderwort, swamp thistle, skullcap, and an unidentified grass (Miller 1974).

1.7. White pine – white cedar forest plot (Zone 6)

Although relatively flat, this area was well-elevated above the slough of the preceding zone. The dominant canopy trees were white cedar (48%) and white pine (22%). Dead trees accounted for 19% of all trees, and tamarack and red ash formed minor components of the canopy cover (7 and 3% respectively). Mean canopy height and percentages canopy and ground cover were slightly greater in this zone than in the slough but there was a reduction in tree density and in the total basal area (Fig. 6). Dominant species in the ground cover were ground juniper, bluejoint grass, marsh fern, starflower,



hound's tongue, deadly nightshade, lyre-leaved rock cress, and lesser duckweed (Schugar *et al.* 1974a).

1.8. Sedge–tamarack dune pond plot (Zone 7)

This zone consisted of an area of open water (54% of total area), an open marshy area (32%), and a tamarack wetland (14%). Dead trees accounted for 36% of total trees; other trees were tamarack (54%), red maple (4%), white ash (2%), and white cedar (2%). Tree density was lower in this zone than in the preceding one (Fig. 6). The marshy edge of the pond was dominated by buttonbush, sedge (*Carex stricta*), marsh fern, and bluejoint grass. Also present were swamp loosestrife, smartweed, false nettle, bull-head lily, marsh cinquefoil, goldenrod, marsh skullcap, bracken fern, broad-leaved

cattail, common bladderwort, Canada bluegrass, fragrant water lily, and swamp milkweed (Hurst *et al.* 1979c).

1.9. Birch–oak savannah and wetland plot (Zone 8)

This zone included a rolling dune ridge and a wetland basin. Most of the plot was grassland savannah with few shrubs or young trees. Buttonbush was the principal shrub in the low lying, seasonal wetland areas. There were many dead trees in the wet areas (39%), most of them white birch. There were eight main tree species in the canopy; white birch (32%), red oak (12%), sassafras (5%), silver maple (3%), white ash (3%), hop hornbeam (3%), red maple (2%), and yellow oak (2%). Canopy height, canopy cover, basal area of the trees, and ground cover were all greater in this zone than in any of the



preceding ones (Fig. 6). Ground cover was dominated by Canada bluegrass, bluejoint grass, marsh fern, Kentucky bluegrass, bracken fern, common milkweed, sedge (*Carex stricta*), false nettle, goldenrod, rice cutgrass, and nightshade (Hurst *et al.* 1979a).

1.10. Red oak – basswood savannah plot (Zone 9)

This zone consisted of a rolling sand dune ridge interspersed with small ponds and marshy areas. As in the preceding zone, most of the area was grassland savannah with few shrubs or saplings. Buttonbush was the only shrub species and it occurred only in the wet areas between the ridges. Eight species dominated the canopy; red oak (37%), American basswood (13%), sugar maple (11%), hop hornbeam (11%), buttonbush (9%), choke cherry (7%), white ash (4%), and white oak

(4%). This zone was very open; tree density, basal area of the trees, canopy cover, and ground cover were all less in this zone than they were in the preceding one (Fig. 6). Although the trees were scattered, many were large; 53% of them were greater than 38 cm DBH, compared to 17% of the trees in the preceding stage. The ground cover was dominated by Canada bluegrass and Kentucky bluegrass. Also prominent were common milkweed, swamp loosestrife, Canada wild rye, rice cutgrass, broad-leaved arrowhead, chair-maker's rush, stinging nettle, broad-leaved cattail, and marsh fern (Verbarg 1980a,b).

1.11. Red oak – sugar maple forest plot (Zone 10)

This zone occurred on the oldest dune-ridges of Long Point, and consisted of gently

rolling slopes interspersed with small ponds and marsh areas. Of the zones studied, this upland deciduous forest had the greatest mean canopy height, canopy cover, and basal area of the trees (Fig. 6). About 60% of the trees were greater than 38 cm DBH. The canopy contained red oak (50%), sugar maple (29%), white oak (4%), white ash (3%), and red maple (3%). Several tree species comprised the remaining 10% of the canopy. Canopy cover was 75% but few understory species were present. Most prominent were two sedges (*Carex pensylvanica* and *C. rosea*), Canada bluegrass, and Kentucky bluegrass (Johnston and Fearis 1973).

1.12. Plots in disturbed areas

Census plots were established in two types of disturbed area; one was in a recreational area in the Provincial Park at the base of the Point, and the other was on a burnt-over ridge about 10 km from the eastern end of the Point.

1.12.1. Recreational dune area

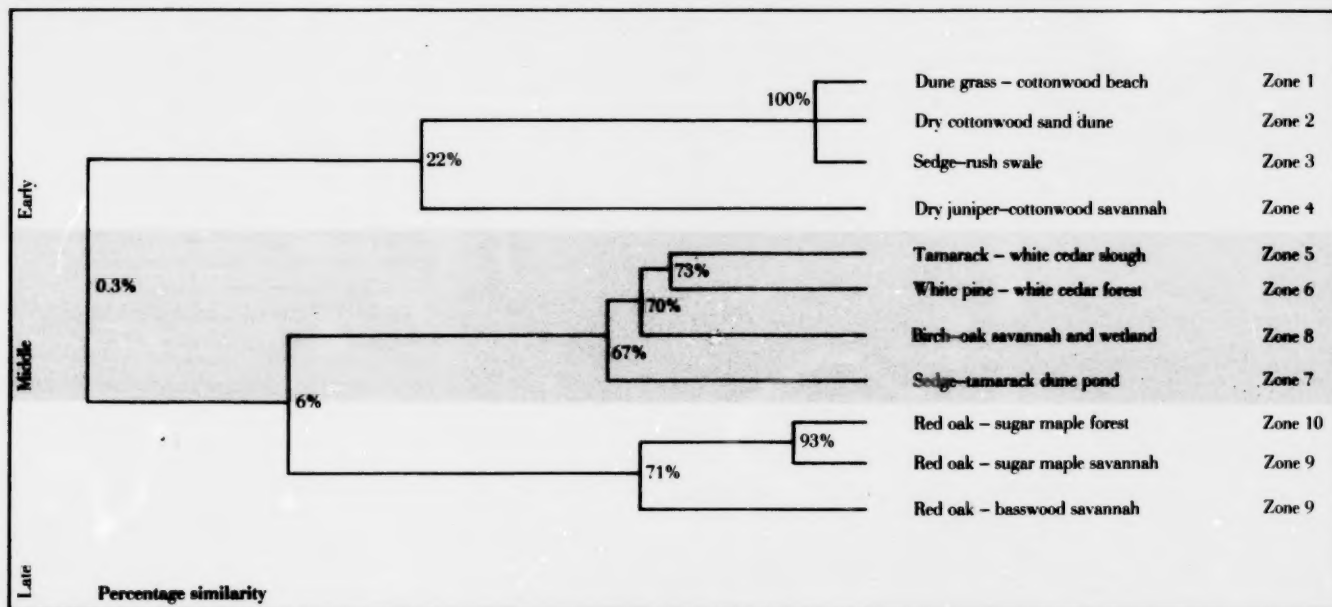
The vegetation of this area was similar to that of the dry cottonwood savannah (Zone 2), although buildings and gravel roads occurred and the ground had been trampled. Eastern cottonwood formed 100% of the tree cover (124 trees per hectare). Basal area of the trees was quite small, however, and only 20% of the trees exceeded 15 cm DBH, compared to 33% in the foredune plot. Despite this, the average canopy height was still high, about 8.5 m. Canopy cover was only 13%, compared to 30% in the undisturbed area of Zone 2. Ground cover averaged 29% and important plants were river-bank grape, white sweet clover, wormwood, common milkweed, and various grasses (Goodlet *et al.* 1974). Plantations of pine occurred nearby.

1.12.2. Bluegrass–milkweed grassland

This area consisted of open rolling dunes, spotted with small marshy interdunes. Before this area was burnt, it was evidently a deciduous savannah. Tree cover was sparse (two trees per hectare). A count of all trees in the area gave the following results: red ash

Figure 7
Dendrogram of vegetation (relative tree species densities)
similarity coefficients.

Figure 7



(32%), red oak (16%), white pine (16%), silver maple (5%), choke cherry (5%), red cedar (5%), dead trees (21%). Regeneration was minimal and only three saplings were found on the 7-ha study area. Ground cover averaged 75% and was dominated by Canada bluegrass, Kentucky bluegrass, milkweed, bluejoint grass, ground cherry, sandwort, sand dropseed, tall couch grass, marsh fern, skull cap, deadly nightshade, field thistle, lyre-leaved rock cress, Indian grass, and horseweed (Evans and Nakashima 1973b).

2. Broad successional stages in dune habitats

Each of the 10 vegetation zones sampled in the dune habitats was fairly distinct. Nevertheless, there was considerable overlap in tree species composition (Table 2). We determined similarity indices (based on the relative density of each tree species in each census plot — see Methods) for all possible pairs of plots. These were then clustered (cosine/centroid method) and a dendrogram

(Fig. 7) was prepared. The intergrading dune-swale-savannah plot was omitted from the analysis and each of the two plots in Zone 9 was included separately. Figure 7 shows three broad successional stages.

The first (early) successional stage is characterized by eastern cottonwood and lightly vegetated dunes and interdunes (Zones 1-4). The only tree species present on the south beach, first dune, and first interdune was cottonwood. The second dune (Zone 4) seemed distinct from earlier vegetation zones, because red cedar was common in addition to cottonwood, but these four zones were more similar to one another than to other communities sampled.

The second (middle) successional stage (Zones 5-8) is dominated by coniferous forests and wetlands. Somewhat surprisingly, the birch-oak savannah and wetland (fourth dune) was more similar to the second interdune and third dune together than it was to the intervening third interdune. Perhaps the burning of the sedge-tamarack dune pond

(third interdune) reduced the species richness or density of common trees.

The final (late) stage (Zones 9 and 10) has red oak as the characteristic forest species. Not surprisingly, the red oak - sugar maple savannah at the south end of Squires Ridge was more similar to the forest on the same ridge than to the nearby red oak - basswood savannah on Courtright Ridge.

The successional patterns of the avian community in dune systems are described within this broad successional framework.

3. Description of the census plots in marsh habitats

3.1. Cattail marsh plot

This plot was in a dense stand of cattail completely surrounded by open water. The northern edge was bounded by the waters of the Inner Bay. Shallower, calmer water with more cattail stands lay on the other sides. The plot was separated from the nearest emergent vegetation by a channel 9 m wide.

Channels and pools comprised 5–10% of the surface area. Water depth was 0–125 cm and averaged 45–60 cm (Dunn and Nol 1977).

3.2. Wet grassy marsh plots

Three plots were established in this seral stage in the Big Creek Marsh Unit (McCracken 1978, 1979). Bluejoint and its associated communities (bluejoint – water sedge and bluejoint–loosestrife) dominated these plots. Together, these three species accounted for an average of about 50% of the plant cover (Table 3). Cattail and reed grass occurred in a few dense stands on each plot and averaged 14 and 8% of the plant cover, respectively. Although burreed was common (11% of plant cover) and widespread, it generally did not occur in pure stands, but was usually found in association with cattail. Arrowhead was also common (10% of plant cover) and widespread, occurring mainly as a member of the understory in the areas dominated by bluejoint. Although wild rice was quite common on one of the plots, it is a late-emerging species and is of little importance to the nesting of marsh birds. Vegetation was moderately dense on all three plots and vegetation and open water were well interspersed; the latter accounted for about 25% of the total area. Water depths on individual plots ranged from 23 to 61 cm and averaged 43 cm (Table 3).

3.3. Dense grassy marsh – shrub carr plot

A dense growth of bluejoint and water sedge dominated the vegetation on this plot in the Hahn Marsh (Table 3). Together, these two species accounted for 60% of the plant cover. Although cattail and burreed were found scattered throughout the plot, they occurred mainly in the shrubby transition zone, never in monodominant stands. Unlike the plots in the wet grassy marsh, the dense grassy marsh stage contained no reed grass, bulrush, or wild rice and only small amounts of cattail and loosestrife (Table 3). The shrub carr at the western end of the plot consisted mainly of scattered speckled alders, with a few dogwoods and maples nearer the edge of the adjacent wet woodland. This plot was rela-

Table 3

Distribution and coverage (%) of emergent plants on breeding-bird census plots in three marsh seral stages at Long Point

Plant species	Cattail marsh	Wet grassy marsh	Dense grassy marsh – shrub carr
Cattail	100	14	4
Bluejoint grass	–	33	52
Burreed	–	11	9
Arrowhead	–	10	10
Loosestrife	–	9	1
Reed grass	–	8	–
Wild rice	–	7	–
Water sedge	–	7	8
Bulrush	–	1	–
Smartweed	–	<1	10
Speckled alder	–	–	6
Red maple	–	–	1
Dogwood	–	–	<1
Rose	–	–	<1
Average water depth (cm)	45–60	43	23

Table 4

Characteristics of tree cover on the wet woodland census plot

Trees	No./ha	Relative density (%)	Relative dominance (%)*
Dead trees	569	47.4	41.4
White ash	223	18.6	20.1
Silver maple	238	19.9	18.4
Red maple	162	13.5	19.5
Black ash	8	0.6	0.6
Totals	1200	100	100

* Dominance is measured in terms of relative basal areas.

tively dry, having minimal water depths (Table 3) and very few areas of open water.

3.4. Wet woodland plot (silver maple swamp)

Flooding caused by high lake levels had killed approximately 47% of the trees on this plot in the Hahn Woods (Table 4). Silver maple was the most common living tree species, followed by white ash and red maple. The total basal areas of each of these three species were about equal (Table 4).

Canopy cover was sparse (35%),

reflecting the large proportion of dead and partially drowned trees. Shrub cover was also sparse, about 5–10%. Maple and ash saplings, red-osier dogwood, and speckled alder were the dominant species. Although not detected within the 2m wide sampling strips, button-bush was common in some of the wetter zones. The herbaceous cover consisted mainly of beggar-tick, burreed, arrowhead, rice cut-grass, and smartweed. Lesser duckweed completely covered the area of open water by midsummer. Water depths ranged from 0 to 60 cm and averaged 20 cm.

Table 5

Breeding-bird territories on five census plots in the early stage of dune succession at Long Point

Habitat	Dune grass – cottonwood beach		Dry cottonwood sand dune		Sedge-rush-swale		Dry juniper-cottonwood savannah		Intergrading dune-swale-savannah					
Years surveyed	1974	1978	1973	1974	1973	1974	1973	1974	1965	1966	1967	1968	1969	
Area (ha)	12.1		10.5		10.3		8.3		19.5					
Species														
American Bittern	–	–	–	–	–	–	–	–	–	–	–	1	–	
Mallard	1	–	–	1	1	1	1	3	1	–	–	1	–	
Blue-winged Teal	–	–	–	–	–	–	–	–	–	–	–	–	1	
Killdeer	–	0.5	–	–	–	–	–	–	1	–	0.5	1	3	
Spotted Sandpiper	0.5	1.5	–	–	–	–	–	–	–	–	–	–	–	
Common Flicker	–	–	–	–	–	–	–	–	1	1	1	–	1	
Eastern Kingbird	+	0.5	+	0.5	1	+	0.5	2	4.5	3	3	5	8	
Tree Swallow	–	–	–	–	–	–	2	–	–	–	–	–	2	
Common Crow	–	–	–	–	–	–	–	–	–	–	0.5	1	–	
House Wren	–	–	–	–	–	–	–	–	–	–	0.5	2	–	
Mockingbird	–	–	–	–	–	–	–	–	–	1	1	–	1	
Brown Thrasher	–	–	–	–	–	–	3	1	1	–	1	–	–	
Eastern Bluebird	–	–	–	–	–	–	–	–	–	0.5	1	–	–	
Starling	–	–	–	–	–	–	1	1	–	–	4	1.5	6	
Bobolink	–	–	–	–	–	–	–	–	–	1	–	–	–	
Eastern Meadowlark	–	–	–	–	–	–	1	–	0.5	–	2	2	4	
Redwinged Blackbird	0.5	0.5	1.5	0.5	3.5	2.5	–	8	–	–	–	–	–	
Northern Oriole	–	–	–	–	–	–	–	–	–	–	0.5	–	–	
Common Grackle	–	–	–	–	–	–	–	9	–	–	–	–	–	
Savannah Sparrow	–	–	–	–	–	–	–	–	–	–	0.5	–	–	
Vesper Sparrow	–	–	–	–	–	–	–	–	1	–	–	–	–	
Chipping Sparrow	–	–	–	–	–	–	2	1	1	2.5	2	1.5	2	
Field Sparrow	–	–	–	–	–	–	1	3.5	3	2	2	2	1	
Song Sparrow	–	–	–	–	–	–	0.5	3	–	–	0.5	3	2	
Total territories	2	3	1.5	2	5.5	3.5	12	31.5	14	11	20	21	31	
Territories/km ²	17	25	14	19	53	34	145	380	72	56	103	108	159	
No. of species	4	4	2	3	3	3	9	9	9	7	15	11	11	
Diversity (<i>H'</i>)	1.04	1.24	0.00	1.04	0.91	0.60	2.04	1.90	1.94	1.80	2.45	2.25	2.13	
Equitability (<i>J'</i>)	0.95	0.90	0.00	0.95	0.83	0.86	0.93	0.87	0.89	0.92	0.90	0.94	0.89	

4. Dune bird communities

We give results for early, middle, and late successional stages of dune habitats. These broad groupings were based on a cluster analysis of tree cover on the census plots (see Fig. 7).

4.1. Plots in the early successional stage

Results of the censuses conducted in this stage (dune grass – cottonwood beach, dry cottonwood sand dune, sedge–rush swale, dry juniper–cottonwood savannah, and intergrading dune–swale–savannah) are given in Table 5. Plots in this stage were characterized by relatively low densities and species diversities of breeding birds.

We recorded a total of 24 species; the 10 most common of these that held at least three territories on any one plot in any one year were considered characteristic of this successional stage. In decreasing order of abundance, these were Eastern Kingbird (17.6% of total territories), Redwinged Blackbird (10.7%), Field Sparrow (9.1%), Starling (8.5%), Mallard (6.3%), Eastern Meadowlark (6.0%), Song Sparrow (5.7%), Common Grackle (5.7%), Killdeer (3.8%), and Brown Thrasher (3.8%). Most of these species and most of the others listed in Table 5 are typical of open habitats and nest on or near the ground. Species restricted to the early successional stage were American Bittern, Killdeer, Spotted Sandpiper, Common Crow, Mockingbird, Eastern Bluebird, Bobolink, Savannah Sparrow, and Vesper Sparrow.

The dune grass – cottonwood beach was comprised of the sandy, pebbly shore of Lake Erie, almost devoid of vegetation; a swath of grass; and a swath of cottonwoods averaging 6 m in height. Only Mallards, Killdeers, Spotted Sandpipers, Eastern Kingbirds, and Redwinged Blackbirds nested there.

The dry cottonwood sand dune plot was located along the crest of the first dune, and was sparsely covered with cottonwood and dune grass. Only three of the above species nested there: Mallards, Eastern Kingbirds, and Redwinged Blackbirds.

The sedge–rush swale plot was located in the first interdune area. This area was fairly



low and wet with relatively few trees, but with a high ground cover. Mallards and redwings nested there and kingbirds from the adjacent dunes fed in this habitat.

Juniper and cottonwood were well established on the second dune (dry juniper–cottonwood savannah). Eleven species of birds nested on this plot; most common were Common Grackle, Redwinged Blackbird, Field Sparrow, Brown Thrasher, and Mallard. Not only did more species breed here than in the first three areas, but the total number of breeding birds increased from an average of 17 pairs/km² on the first dune to 263 pairs/km² on the second dune.

The intergrading dune–swale–savannah plot contained elements of all the other early successional habitats. Twenty-one species of birds nested there; most common were Eastern Kingbird, Starling, Eastern Meadowlark, Field Sparrow, Song Sparrow, and Killdeer.

4.2. Plots in the middle successional stage

Plots in this stage (tamarack – white cedar slough, white pine – white cedar forest, sedge–tamarack dune pond, birch–oak savannah and wetland) generally had moderate densities of breeding birds and high levels of species diversity and equitability (Table 6).

A total of 40 species held territories (Table 6); the 10 most characteristic were: Redwinged Blackbird (21.3% of all territories), House Wren (9.3%), Tree Swallow (7.4%), Northern Oriole (6.2%), Eastern Kingbird (4.8%), Common Grackle (4.6%), Common Yellowthroat (4.0%), Eastern Wood Pewee (3.8%), Chipping Sparrow (3.7%), and Yellow Warbler (3.4%). As expected, most species in this stage were typical of woodlands or clearings and woodland edges. Also notable was the fact that this stage contained a mixture of species common to the early and late stages. Species restricted to the middle successional stage were Hairy Wood-

Table 6

Breeding-bird territories on four census plots in the middle stage of dune succession at Long Point

Habitat	Tamarack - white cedar slough			White pine - white cedar forest			Sedge- tamarack dune pond	Birch-oak savannah and wetland	
Years surveyed	1973	1974	1975	1973	1974	1975	1978	1978	1980
Area (ha)	4.05	6.07	6.07	1.21	4.00	4.00	9.66	5.85	5.85
Species									
Mallard	-	1	1	1	1	1	-	1	-
Red-tailed Hawk	-	-	-	-	-	-	-	-	+
American Woodcock	-	1	1	-	-	-	-	-	-
Mourning Dove	-	1	-	1	-	-	-	-	-
Yellow-billed Cuckoo	-	-	1	-	-	-	-	2.5	3
Whip-poor-will	-	-	-	-	2	-	-	+	-
Common Flicker	1	-	-	1	-	-	1	5	3.5
Red-headed Woodpecker	-	-	-	-	-	-	-	1	-
Hairy Woodpecker	-	-	-	-	-	+	-	-	1
Downy Woodpecker	-	-	-	-	-	-	-	-	1
Eastern Kingbird	1	4	4	-	-	1	3	2	3.5
Great Crested Flycatcher	2	0.5	1	1	1	0.5	-	4	4
Eastern Wood Pewee	1	1	2	1	1.5	0.5	-	5	11.5
Tree Swallow	2	1	2	-	-	-	3	15	17.5
Blue Jay	-	-	+	-	-	1	-	-	-
Black-capped Chickadee	-	1	3	-	3	3	-	-	-
House Wren	4	1	4.5	1.5	7	5	-	6	3.5
Carolina Wren	-	1	-	-	-	-	-	-	-
Gray Catbird	1	-	1.5	-	1	1	-	3.5	1.5
Brown Thrasher	-	+	+	-	-	-	-	-	-
American Robin	-	-	1	-	-	-	-	-	-
Blue-gray Gnatcatcher	-	-	-	-	-	-	-	0.5	1
Cedar Waxwing	-	1	-	-	-	-	-	-	-
Starling	2	1	1	-	-	-	1	2	1
Red-eyed Vireo	-	-	-	-	-	-	-	3	-
Yellow Warbler	4	1	4	-	-	-	1	0.5	5.5
Magnolia Warbler	-	-	-	-	-	1	-	-	-
Common Yellowthroat	1	-	0.5	0.5	2.5	-	3	5	5
American Redstart	-	1	1	-	-	-	-	-	-
Eastern Meadowlark	-	-	-	-	-	-	+	-	-
Redwinged Blackbird	6.5	6	8	-	1	1	38	6	5
Northern Oriole	1	4	5.5	-	-	-	2	7	4
Common Grackle	-	6	6	-	-	+	-	2.5	3
Brown-headed Cowbird	1	1	1	-	-	-	-	1	1
Cardinal	1	1	2	-	-	1	-	-	-
Indigo Bunting	-	1.5	-	-	1	0.5	-	-	-

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Table 6 cont'd

Breeding-bird territories on four census plots in the middle stage of dune succession at Long Point

Habitat	Tamarack - white cedar slough			White pine - white cedar forest			Sedge-tamarack dune pond	Birch-oak savannah and wetland	
	1973	1974	1975	1973	1974	1975	1978	1978	1980
Years surveyed									
Area (ha)	4.05	6.07	6.07	1.21	4.00	4.00	9.66	5.85	5.85
Species									
Rufous-sided Towhee	-	-	-	2	1	2	-	-	-
Chipping Sparrow	-	2	3	2	2.5	2	+	-	-
Field Sparrow	-	-	-	-	2	2	-	-	-
Song Sparrow	2.5	1	3	-	-	-	1	-	-
Total territories	31	39	57	11	26.5	22.5	53	72.5	75.5
Territories/km ²	765	642	939	909	663	556	549	1239	1290
No. of species	15	23	24	9	13	17	11	20	19
Diversity (<i>H'</i>)	2.48	2.79	2.83	2.12	2.34	2.47	1.15	2.63	2.53
Equitability (<i>J'</i>)	0.91	0.90	0.92	0.97	0.91	0.91	0.52	0.89	0.88

pecker, Carolina Wren, Gray Catbird, Cardinal, Blue-gray Gnatcatcher, Magnolia Warbler, and Indigo Bunting.

The tamarack - white cedar slough was the second most densely populated habitat of the middle successional stage. The open pools and dense tree cover provided habitat for 29 bird species; most prominent were Red-winged Blackbird, Common Grackle, Northern Oriole, House Wren, Eastern Kingbird, Yellow Warbler, Song Sparrow, Chipping Sparrow, and Black-capped Chickadee.

The white pine - white cedar forest was somewhat less densely populated and contained fewer species (21) than the previous site; most common were House Wren, Black-capped Chickadee, and Rufous-sided Towhee, all typical of mixed or evergreen forests.

The sedge-tamarack dune pond was a much more open and wet habitat than were the preceding zones. Bird density, species diversity, and equitability were all lower there. Only 11 species nested in this area. The marshy areas were particularly attractive to redwings; other prominent species were Eastern Kingbird, Tree Swallow, and Common Yellowthroat.

The birch-oak savannah was dominated by deciduous trees, many of them dead. This habitat was characterized by a very high breeding-bird density and a high level of

species diversity. Twenty-three species nested there; most numerous were Tree Swallow, Northern Oriole, House Wren, Common Flicker, Eastern Wood Pewee, Common Yellowthroat, Great Crested Flycatcher, Gray Catbird, and Red-eyed Vireo.

4.3. Plots in the late successional stage

This stage included censuses conducted in the most mature woodlands of Long Point (oak-basswood savannah, oak-maple savannah, and oak-maple forest). Results of the censuses are given in Table 7. Breeding-bird densities were very high and, although slightly lower than in the middle stage, levels of species diversity and equitability were also high.

Characteristic species of the late successional stage were nearly identical to those found in the preceding stage, although there was a slight difference in the rankings. The 10 most characteristic species were: Redwinged Blackbird (19.2% of all territories), Eastern Wood Pewee (13.8%), House Wren (11.6%), Tree Swallow (9.4%), Common Grackle (6.2%), Starling (5.4%), Northern Oriole (5.1%), Eastern Kingbird (4.5%), Common Yellowthroat (4.2%), and Yellow Warbler (3.6%). The most notable change in the rankings was the relative increase in numbers of wood pewees (13.8%) in this stage com-

pared to 3.8% in the middle stage. Only two species (Downy Woodpecker and Warbling Vireo) were restricted to this stage.

Although most of the species listed in Table 7 are typical of deciduous woodlands, the presence of redwings, Mallards, and Blue-winged Teal might seem unusual. However, aquatic areas are interspersed throughout Long Point, including the mature woodlands, so the occurrence of species normally associated with wet areas is to be expected.

The oak-maple savannah and oak-basswood savannah census plots were structurally very similar. Mature deciduous trees, scattered throughout these habitats, were a notable feature. The bird communities were also similar. These plots were characterized by high population densities and high levels of species diversity. A total of 20 species nested; most common were Redwinged Blackbird, Eastern Wood Pewee, Tree Swallow, Starling, Common Grackle, House Wren, Yellow Warbler, Northern Oriole, Eastern Kingbird, and Great Crested Flycatcher.

The oak-maple forest had more canopy cover and greater tree density than the preceding two plots. This zone was not as densely populated as were the oak savannahs. A total of 20 species nested on this plot; most common were House Wren, Eastern Wood Pewee, Redwinged Blackbird, Northern Ori-

ole, Eastern Kingbird, Tree Swallow, Red-eyed Vireo, Blue-winged Teal, Blue Jay, and Common Yellowthroat.

5. Marsh bird communities

5.1. Cattail marsh plot

Bird species diversity and equitability were extremely low on this plot (Table 8). Redwinged Blackbirds dominated the community and accounted for about 85% of the total number of territories. Overall density on this plot (4312 territories/km²) was greater than on any other census plot in the Long Point region. This surprisingly high density was chiefly due to the large population of redwings. Species that held at least three territories on the plot were considered characteristic. In decreasing order of abundance these were Redwinged Blackbird, Black Tern, and Common Gallinule.

Two points should be made with regard to sampling biases on this plot. First, breeding-bird density is much lower in a large, unbroken stand of cattail than in a small, open section such as that studied by Dunn and Nol (1977). Munroe (1965) found that the large tracts of cattail in the Long Point Company Marsh are relatively unproductive of breeding birds and noted that densities of redwings and marsh wrens were low in the marsh interior. Most of the bird species characteristic of cattail marshes prefer the close association of open water; thus, many of the populations are concentrated in the small beds of cattail and along the periphery of the larger beds rather than being uniformly distributed throughout the marsh. These concentrations of bird productivity are reflected by the semi-colonial or gregarious nesting behaviour of such species as gallinules, terns, and even redwings. Holm (1973) found that densities of redwings were greater in scattered patches of cattail intersected by channels of open water than they were in unbroken sections of cattail. Similarly, Weller and Spatcher (1965) showed that the number of redwings increased on two Iowa lakes as the marsh became broken up by muskrat activity. They also point out that swimming waterbird species naturally require

Table 7
Breeding-bird territories on three census plots in the late stage of dune succession at Long Point

Habitat	Red oak - sugar maple savannah	Red oak - basswood savannah	Red oak - sugar maple forest	
	1979	1979	1973	1975
Years surveyed	7.50	7.50	6.88	
Area (ha)				
Species				
Mallard	1	1	2	1
Blue-winged Teal	-	1	3	-
American Woodcock	-	-	2	-
Mourning Dove	-	-	1	-
Yellow-billed Cuckoo	1	-	-	-
Common Flicker	1	0.5	-	2
Red-headed Woodpecker	2	-	-	-
Downy Woodpecker	-	-	-	1
Eastern Kingbird	3.5	4	3	2
Great Crested Flycatcher	5	1	-	2
Eastern Wood Pewee	17.5	8.5	6	6
Tree Swallow	11	10	3	2
Blue Jay	-	-	3	-
House Wren	5	5	11	11
American Robin	-	-	2	1
Cedar Waxwing	-	1	-	-
Starling	5	10	-	-
Red-eyed Vireo	-	-	-	4
Warbling Vireo	1	-	-	-
Yellow Warbler	9	1	-	-
Common Yellowthroat	6.5	2	3	-
American Redstart	-	-	1	-
Redwinged Blackbird	17.5	23.5	4	8
Northern Oriole	5	3	3	3
Common Grackle	5	8	2	2
Brown-headed Cowbird	1	-	-	-
Rufous-sided Towhee	-	-	2	-
Song Sparrow	1.5	2	-	-
Total territories	98.5	81.5	51	45
Territories/km ²	1313	1087	741	654
No. of species	18	16	16	13
Diversity (<i>H</i>)	2.51	2.26	2.57	2.26
Equitability (<i>J'</i>)	0.87	0.82	0.93	0.88

adjacent areas of open water as well as vegetation cover. Dunn and Nol's (1977) results, therefore, apply only to small broken stands of cattail and are not representative of the marsh as a whole.

Second, the census area was very small — only about 2.8 ha. Erskine (1977) and others have cautioned that density measurements can be overestimated when based on very small plots. Also, small plots do not adequately sample the uncommon species; species richness, therefore, is likely to be underestimated.

5.2. Wet grassy marsh plots

Three study areas were censused in the Big Creek Marsh Unit (Table 8). Bird species diversity and equitability were greater in this habitat than in the cattail marsh. Densities were moderately high, ranging from 715 to 955 territories/km², and averaging 809 territories/km² (Table 8). The relatively large areas sampled annually (10 ha/plot) result in density measurements that are probably fairly reliable for this habitat. Biases resulting from clumping of populations are also greatly reduced when large areas are sampled (see Erskine 1968).

A total of 16 species held territories on the wet grassy marsh plots. In decreasing order of average abundance, characteristic species were Redwinged Blackbird, Long-billed Marsh Wren, Swamp Sparrow, Common Yellowthroat, Common Gallinule, Virginia Rail, American Coot, Mallard, Sora.

A comparison between the results of censuses conducted in 1978 and 1979 shows that the densities of some species changed considerably (Table 8). This is presumably due to changes in the suitability of the habitat. In 1979, water cover was reduced and vegetation cover became more dense. Thus populations of species that require areas of open water generally declined in 1979. Populations of the more terrestrial passerine species, however, generally increased as the marsh became drier and the vegetation more dense. These two effects combined to reduce species diversity and equitability in 1979, although breeding-bird density increased.

Table 8
Breeding-bird territories in three marsh successional stages at Long Point

Successional stage	Wet grassy marsh (3 plots)						Dense grassy marsh-shrub carr	
Years surveyed	1977	1978	1979	1978	1979	1978	1978	1979
Area (ha)	2.76	10.0		10.0		10.0	5.50	
Species								
Pied-billed Grebe	—	—	—	1.0	—	—	—	—
Least Bittern	1.0	2.0	1.5	0.5	—	—	—	—
Canada Goose	—	—	1.0	1.0	1.0	—	0.5	1.0
Mallard	2.0	3.0	2.0	2.0	—	1.0	1.0	—
Blue-winged Teal	—	1.0	—	1.0	—	1.0	—	—
Virginia Rail	—	3.0	3.0	2.0	3.0	0.5	—	—
Sora	—	3.0	0.5	—	—	2.5	—	—
Common Gallinule	7.0	5.5	2.5	4.0	—	5.0	—	—
American Coot	—	5.0	—	3.0	—	2.0	—	—
Common Snipe	—	—	—	1.0	0.5	0.5	1.0	—
Black Tern	8.0	—	—	0.5	0.5	1.0	—	—
Eastern Kingbird	—	—	—	—	—	—	—	0.5
Long-billed Marsh Wren	—	27.0	33.0	15.0	19.5	20.5	—	—
Starling	—	—	—	—	—	—	—	0.5
Common Yellowthroat	—	1.5	6.0	3.0	5.0	2.5	5.0	6.5
Redwinged Blackbird	101.0	27.0	26.0	29.0	32.0	26.0	8.5	14.5
Common Grackle	—	2.0	0.5	2.0	1.0	—	1.0	0.5
Swamp Sparrow	—	6.5	19.5	7.0	16.5	9.0	9.0	12.0
Song Sparrow	—	—	—	—	—	—	1.5	0.5
Total territories	119	86.5	95.5	72.0	79.0	71.5	27.5	36.0
Territories/km ²	4312	865	955	720	796	715	500	655
No. of species	5	12	11	15	9	12	8	8
Species diversity (<i>H'</i>)	0.60	1.91	1.67	1.95	1.51	1.71	1.63	1.38
Equitability (<i>J'</i>)	0.37	0.77	0.70	0.72	0.69	0.71	0.78	0.66

5.3. Dense grassy marsh — shrub carr plot

Habitat was more uniform in this marsh than it was in the wet grassy marsh. Vegetation was much more dense and water cover was minimal. There were few waterbird species and species diversity was thus reduced (Table 8). Breeding-bird density was low relative to the other marsh study areas, ranging from 500 territories/km² in 1978 to 655 territories/km² in 1979, and averaging 578 territories/km². As in the case of the wet grassy marsh census plots, the amount of open water decreased between 1978 and 1979, while the density of the vegetation increased. The drier conditions were paralleled by increases in densities of yellowthroats, redwings, and Swamp Sparrows in 1979.

A total of 10 species maintained territories on this census area (Table 8). Characteristic species were Redwinged Blackbird, Swamp Sparrow, and Common Yellowthroat; these three species accounted for about 87% of the total number of territories.

5.4. Wet woodland plot (silver maple swamp)

A total of 31 territorial species were recorded on the wet woodland plot during the 2-year study in the Hahn Woods (Table 9). Bird species diversity and equitability were much greater on this plot than they were in any of the other marsh seral stages (Table 8).

Breeding-bird densities averaged 1204 territories/km², second only to the cattail

marsh plot. Nine species were characteristic of the bird community in the wet woodland. In decreasing order of average abundance, these were Common Grackle, Tree Swallow, Starling, Redwinged Blackbird, Canada Goose, Mourning Dove, Prothonotary Warbler, House Wren, and Blue-gray Gnatcatcher.

One notable feature of this swamp was the presence of so many cavity-nesting species. Twelve of the 31 species listed in Table 9 utilized cavities and accounted for about 60% of the total number of territories on the plot; these included Wood Duck, woodpeckers, Great Crested Flycatcher, Tree Swallow, House Wren, Starling, and Prothonotary Warbler. Some species not normally associated with cavity-nesting behaviour were also found nesting in such situations. These included grackles, cowbirds that parasitized Prothonotary Warbler nests, and the Great Horned Owl.

6. Avian communities and plant succession

6.1. Density, diversity, equitability, and "edge effect"

Densities of breeding birds are affected by a variety of proximate factors, notably the amount and diversity of nesting substrate, food supply and diversity, biomass of the individual bird species, and foraging distance. These factors are inter-connected and lead to complex patterns of inter-specific and intra-specific resource use. One of the few generalizations that can be made in this regard is that the breeding density of many species of birds is expected to be low in habitats that are relatively unproductive because territories must be large (Ricklefs 1973). Differences in the productivities of the seral stages of Long Point may be responsible, in part, for the differences observed in breeding-bird densities.

It is generally recognized that although bird species diversity may be linked to plant species diversity, it is much more affected by the diversity of plant life forms and the general structural heterogeneity of the environment (MacArthur and MacArthur 1961; MacArthur *et al.* 1962, 1966; Orians 1969; Tramer 1969;

Roth 1976). In such habitats as fields and marshes, which are structurally simpler than forests, the opportunities for within-habitat specialization are much more limited (Cody 1968).

Many studies of avian succession have found that the number and density of breeding bird species parallels successional sequence in habitat (Kendeigh 1948, Odum 1950, Johnston and Odum 1956, Shugart and James 1973, Van Orman 1976). However, Kendeigh (1948) noted a decline in the number of species and density of birds in the final stages of succession in a terrestrial area, and as Johnston and Odum (1956) point out, density may peak early in the succession of wetlands, even though a peak in species diversity may occur later. Apparently, various patterns of change in density and diversity occur naturally in various successional seres.

Equitability measures the evenness of species abundances and is complementary to the diversity concept. Wiens (1973), in his study of grassland communities, found that the densities of each species were more equitable in the later stages of succession. In early successional stages, bird populations were often dominated by a few species.

It is well known that species variety and number of individuals tend to be high at the interface (ecotone) between two habitats (Preston 1960, Odum 1971, Emlen 1973). This enrichment at community junctions is known as the "edge effect". Emlen (1973) suggested that the productivity of one or both of two adjoining habitats is enhanced by being peripheral to the other and this may account for an increased number of birds. Species enrichment at the ecotone may also be due to mixing of species from both habitats as well as to the presence of species that are characteristic of the ecotone. Mixed habitats consequently have much "edge" as compared with tracts of uniform habitat. Studies have shown that mixtures of plant communities contain mixtures, or ecotones, of their respective bird communities (Aldrich 1943, Kendeigh 1948, Martin 1960).

Table 9
Breeding-bird territories on the wet woodland census plot

Years surveyed	1978	1979
Area (ha)	6.5	
Species		
Canada Goose	3.0	6.0
Mallard	1.0	1.0
Wood Duck	1.0	—
Mourning Dove	2.0	6.5
Yellow-billed Cuckoo	1.0	1.0
Great Horned Owl	0.5	+
Common Flicker	1.0	1.0
Red-headed Woodpecker	1.0	1.0
Downy Woodpecker	—	1.0
Eastern Kingbird	2.5	+
Great Crested Flycatcher	1.0	2.0
Eastern Wood Pewee	1.5	1.0
Tree Swallow	10.0	13.5
House Wren	2.5	3.0
Gray Catbird	—	+
American Robin	1.0	1.5
Blue-gray Gnatcatcher	3.0	2.0
Cedar Waxwing	—	1.0
Starling	6.0	6.0
Red-eyed Vireo	1.0	1.0
Warbling Vireo	2.5	2.5
Prothonotary Warbler	3.0	4.5
Common Yellowthroat	2.0	0.5
American Redstart	—	0.5
Redwinged Blackbird	4.5	5.0
Northern Oriole	1.5	0.5
Common Grackle	16.0	16.5
Brown-headed Cowbird	1.0	2.0
Cardinal	1.0	—
Indigo Bunting	1.0	0.5
Song Sparrow	2.0	1.5
Total territories	73.5	83.0
Territories/km ²	1131	1277
No. of species	27	29
Species diversity (<i>H'</i>)	2.85	2.71
Equitability (<i>J'</i>)	0.86	0.83

A forested ridge with typical lack of forest understory
(photo: J. Planck)



6.2. Succession of bird communities in dune habitats

Habitats dominated by cottonwoods comprise the earliest stages of dune succession and support the fewest birds both at Long Point and on sand dunes along Lake Michigan (Van Orman 1976). Van Orman sampled a habitat that appears most similar to our dry juniper-cottonwood savannah, and the number of species and density of territorial males at Long Point (Table 10) were both similar to the Michigan values of 10 and 250. Species composition varied slightly: Tree Swallow, Chipping Sparrow, and Eastern Meadowlark are missing in Michigan; Vesper Sparrow and Brown-headed Cowbird are missing at Long Point. Comparable beach and early dune habitats were not sampled in Michigan. The number of species found in these habitats on Long Point is comparable to numbers found on treeless prairie but the density of territorial males was far greater on prairie (Wiens 1974). These early successional habitats at Long Point also support far fewer birds than do fields and grasslands in Ontario County on the mainland (Speirs and Orenstein 1967). The simple breeding-bird communities in early successional stages at Long Point probably reflect both the lack of tree cover and the paucity of ground cover.

The coniferous forests on Long Point support a density of breeding birds comparable to mainland forests. Oelke (1967a,b) reported 22 to 27 species at densities of 659 to 694 territorial males/km² on two upland pine forest plots in eastern Ontario. These figures are similar to those for the white pine - white cedar forest on Long Point (21 and 715). However, species composition differed considerably; only the Chipping Sparrow was among the most numerous five species in all three plots. The tamarack - white cedar slough at Long Point had fewer species and a lower territorial density than did a black spruce - tamarack - white cedar bog in southern Ontario (Speirs and Orenstein 1975). Species composition was also very different; many northern species, such as White-throated Sparrow, were common in the southern Ontario bog but absent from Long Point.

Figure 8

Bird species richness, density, diversity, and equitability in various successional zones at Long Point. Disturbed areas are plotted separately

(A = zone 7, B = recreational dune, C = bluegrass-milkweed grassland)

Species richness was less in the oak forests and savannahs on Long Point than in nearby forests. Forests and savannahs on Long Point contained 20 species but mainland forests in Elgin, Norfolk, Essex, and Ontario counties contained 20, 28, 30, and 43 species, respectively (Speirs and Frank 1970a,b; Speirs and Orenstein 1975; Nol *et al.* 1978). Several species (including Wood Thrush, Veery, Scarlet Tanager, Rose-breasted Grosbeak, Ovenbird, and White-breasted Nuthatch) were present in most or all of these other forests but absent at Long Point. The paucity of species at Long Point indicates that forest structure may not be as complex as it is elsewhere (MacArthur and MacArthur 1961).

However, territorial densities at Long Point (mean of 1084/km² on oak forest and savannah plots) were greater than in oak forests in west Michigan (606/km², Van Orman 1976), a maple forest in eastern Ontario (772/km², Price and Speirs 1972), a beech forest (Springwater Forest) in Elgin County (350/km², Speirs and Frank 1970a), a hackberry-basswood forest at Point Pelee (580/km², Speirs and Frank 1970b), and an oak-maple forest just north of Port Rowan (435/km², Nol *et al.* 1978).

Breeding birds were more abundant in the interdunal wetlands on Long Point than on the adjacent dune ridges. In the first interdune (Zone 3) there were only three species but the density of territorial males increased from 17/km² on the first ridge to 44/km² in the swale. In the second interdune (Zone 5), which was dominated by coniferous trees and ponds, the number of species reached its maximum and the density of territorial males was higher than on the dune ridges on either side of the interdune. The next interdune (Zone 7) included a large proportion of open water and, in fact, these later interdunes are usually wide and flooded with large ponds. Breeding-bird density was actually lower in this interdune than in the earlier one. Older interdunes were not sampled because of the wide expanses of open water. These older interdunes are typically bordered by buttonbush, and some of them were included in the oak-dominated plots. The

Figure 8

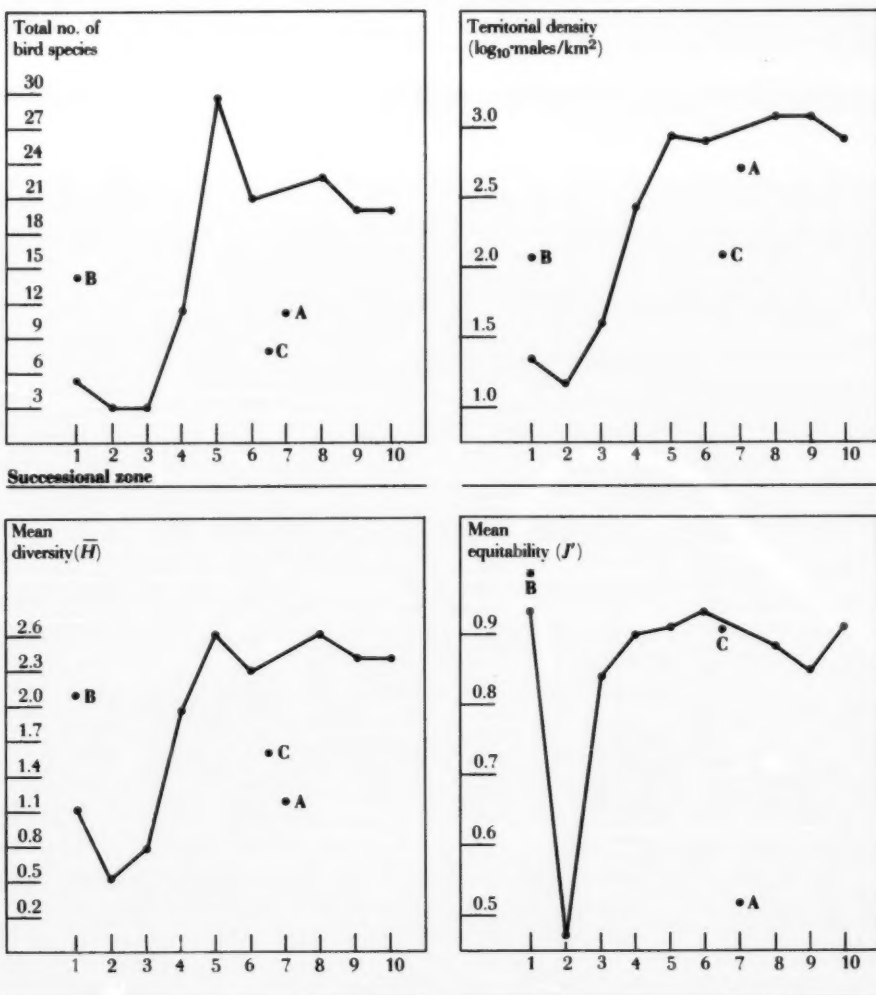


Table 10
Bird community statistics in 10 seral stages at Long Point

Successional zone	Mean ecological diversity ($\bar{H}$)	Mean territorial density (males/km ²)	Total no. of species	Mean equitability (J')
1. Dune grass - cottonwood beach	1.14	21.0	5	0.93
2. Dry cottonwood sand dune	0.52	16.5	3	0.47
3. Sedge-rush swale	0.75	43.5	3	0.84
4. Dry juniper-cottonwood savannah	1.97	262.5	11	0.90
5. Tamarack - white cedar slough	2.63	782.0	29	0.91
6. White pine - white cedar forest	2.31	715.0	21	0.93
7. Sedge-tamarack dune pond	1.15	549.0	11	0.52
8. Birch-oak savannah and wetland	2.58	1264.5	23	0.89
9. Red oak - basswood savannah	2.39	1198.5	20	0.85
10. Red oak - sugar maple forest	2.42	698.0	20	0.91
Spearman rank correlation coefficients				
	$r_s = 0.84$			
	$r_s = 0.92$			
	$r_s = 0.47$			

Table 11
Summary statistics for dune bird communities in three broad successional stages at Long Point

Feature	Early	Middle*	Late
Average density (No. territories/km ²)	86	839 (875)	948
Total no. of species	13	40 (39)	28
Average species diversity ($\bar{H}$)	1.10	2.37 (2.52)	2.40
Average equitability (J')	0.79	0.87 (0.91)	0.88

* Values in parentheses omit the effects of the sedge-tamarack dune pond.

effect of buttonbush wetlands on the bird community in late successional stages is apparent from the presence of Mallards, Blue-winged Teal, Redwinged Blackbirds, and Common Yellowthroats.

Table 10 and Figure 8 summarize features of the bird community in each successional zone. Parameters were determined independently for each plot-year and values presented are, with the exception of species richness, means of these independent estimates. Species richness is the total number of species holding territories in a given successional zone. The sedge-tamarack dune pond (Zone 7) was not included in the curves connecting point values in various successional zones. Diversity, density, species richness, and equitability were all probably reduced in this

area because of past fires. This plot, the recreational dune, and bluegrass-milkweed grassland are all plotted separately on Figure 8.

Ecological diversity ($\bar{H}$) first peaked in the tamarack - white cedar slough (Zone 5), dipped, reached a similarly high level in the birch-oak savannah and wetland (Zone 8), and then declined slightly in the late successional zones. Species richness followed a similar pattern and was the parameter most highly correlated with diversity ($r_s = 0.92$). Equitability displayed a somewhat different pattern. Like other parameters it dipped from Zone 1 to Zone 2. It peaked in Zone 6; thereafter, however, equitability did not vary greatly from zone to zone (Fig. 8).

Ecological diversity peaked in the

middle stages of succession at Long Point (Table 11). Karr (1968) and Kendeigh (1948) found a similar pattern in avian succession in central Illinois and northern Michigan, respectively. Other studies, however, have found no decline in bird diversity during late successional stages (Johnston and Odum 1956, Shugart and James 1973, Van Orman 1976) although Johnston and Odum and Shugart and James may not have sampled true climax successional stages. Species richness and equitability also peaked in middle successional stages at Long Point; territorial densities, however, increased throughout the three broad successional stages.

Ranges in the values of species richness, density, and diversity were greater at Long Point than in several other successional studies (Table 12). Very early successional stages at Long Point supported fewer species at lower densities than in other studies that were reviewed. The greater range of values at Long Point is due to the low values from early successional stages, and not the high values later in succession. The breeding-bird communities on the beach, first dune, and first interdune appear to be very simple compared to many communities elsewhere. These early successional stages have values of species richness, density, and diversity comparable to some agricultural and grassland communities in the prairies of Central North America (Wiens 1973).

Several factors have altered the vegetation of certain areas on Long Point. A provincial park was established at the base of Long Point in 1956; natural vegetation was altered by the planting of a pine plantation there in the 1960s; and the park receives heavy recreational use during the summer. Fire is also an important factor at Long Point; an area in the middle of the Point was burnt at least 40 years ago, and even today very few trees are present. Less intense fires have recently burnt parts of Courtright and Squires ridges. These grass fires have tended to remove saplings as well as some mature trees.

Breeding-bird census plots were established in three disturbed habitats: the provincial park and a severe burn on a bluegrass-milkweed grassland (upland) site

Table 12

The range of values for number of species, density, and diversity for various studies of breeding-bird communities

Habitat	No. of species	Density (No. territories/km ²)	Diversity	Source
Sand dune succession (Long Point)	3-29	17-1265	0.52-2.63	Present study
Sand dune succession (Lake Michigan)	10-28	250-804	2.13-2.95	Van Orman 1976
Upland succession (Arkansas)	7-27	284-914	1.19-2.86	Shugart and James 1973
Forests (Ontario County)	15-37	712-1752	-	Speirs and Orenstein 1975
Grasslands (Ontario County)	6-17	230-823	-	Speirs and Orenstein 1967

Table 13

Breeding-bird territories in two disturbed areas at Long Point

Habitat	Recreational dune area		Bluegrass-milkweed grassland	
	1973	1974	1973	1974
Years surveyed	8.55		6.68	
Area (ha)				
Species				
Mallard	-	1	0.5	1
Black Duck	-	-	1	-
Marsh Hawk	-	-	1	-
Killdeer	1	-	-	-
Mourning Dove	1	1	-	-
Eastern Kingbird	2	1	1	-
Tree Swallow	1	-	1	-
Brown Thrasher	2	-	-	-
American Robin	1	-	-	-
Starling	-	1	-	-
Common Yellowthroat	-	1	-	-
Eastern Meadowlark	1	-	2.5	1.5
Redwinged Blackbird	1	1	4	3
Common Grackle	3	-	-	-
Brown-headed Cowbird	1	-	-	-
Field Sparrow	-	1	1	1
Total territories	14	7	12	6.5
Territories/km ²	164	82	180	97
No. of species	10	7	8	4
Species diversity (<i>H'</i>)	2.21	1.95	1.86	1.27
Equitability (<i>J'</i>)	0.96	1.00	0.89	0.92

(Table 13); and a severe burn on a lowland sedge-tamarack dune pond site (Table 6). The provincial park plot had only one tree species (eastern cottonwood); tree cover was relatively sparse and immature compared to the first dune ridge farther east on the Point, but despite this, species richness, density, and diversity of breeding birds were greater in the park. Most of the species that occurred on the naturally vegetated second dune ridge were also found in the park, as were five species that appeared in later successional zones. The vegetation in the park as a whole is somewhat more complex than that of the first dune ridge. In particular, the nearby pine plantation and numerous river-bank grape tangles increase the complexity of vegetation and this is reflected in the increased diversity of the breeding-bird community.

The severely burnt upland ridges were probably birch-oak savannah before the burn, because the few remaining trees are most similar to the tree species in our birch-oak plot and the physical location of the plot precludes an older forest. As might be expected, the fire has drastically reduced the breeding-bird community. Species richness, density, and diversity were all much lower than in the birch-oak savannah and wetland. Open country species such as meadowlark and Field Sparrow were common in the burnt area.

In the adjacent lowland site (the sedge-tamarack dune pond), which was also burnt, the breeding-bird community was less complex than expected (Fig. 8). Species richness was only about half what would be expected from the shape of the diversity curve. The density of territorial males was low despite the high density of Redwinged Blackbirds. Ecological diversity and equitability were greatly reduced because of the high redwing density. This reduction in breeding birds was probably a result of the loss of tree cover around the wetland. A small clump of tamarack and occasional red maple, white ash, and white cedar survived the fire, but dead tree stumps were much in evidence. These tree stumps served as nest sites for Common Flicker, Tree Swallow, and Starling, but the loss of the forest prevented many

species from nesting in this habitat.

The less severely modified savannahs of Courtright and Squires ridges are the result of grass fires and, possibly, overgrazing by deer. The breeding-bird communities were only slightly different from the apparently intact forest at the eastern end of Squires Ridge. Warbling Vireo replaced Red-eyed Vireo; American Robin, Blue Jay, and Rufous-sided Towhee were not found in the savannahs. Red-headed Woodpecker, Eastern Wood Pewee, and Starling reached their highest densities in these savannahs. Species diversity in the savannahs was comparable to that in the oak-maple forest but the density of territorial males was actually greater in the savannahs. Although these more open forests do appear to have been modified, the impact on bird communities has not necessarily been negative.

Some general conclusions from the above material suggest that structural heterogeneity is of high importance in determining the character of bird communities on the sand dunes at Long Point.

1. It seemed that low species richness, density, and diversity in early successional stages (Zones 1 to 3) reflected low tree and ground cover values.
2. Interdune areas, often wet or with standing water, had higher densities of birds than nearby upland ridges.
3. In two disturbed areas (sedge-tamarack dune pond, bluegrass-milkweed grassland) where structural heterogeneity (tree cover) was reduced, bird species richness, density, and diversity were also reduced. In a third area (recreational dune) where heterogeneity was artificially increased, species richness, density, and diversity also increased.

In Table 14, the diversity of breeding-bird communities was moderately correlated with diversity in the density and dominance of all trees by size class ($r_s = 0.68$ and 0.66 , respectively). This indicates that heterogeneity in numbers and sizes of tree stems increases bird diversity. However, when tree species was considered (size class ignored), correlations between density and basal area with bird species diversity increased ($r_s = 0.84$ and

Table 14

Ecological diversity (H') in various dune successional zones on Long Point

Successional zone	Diversity (H')			
	Birds	Density of common tree species	Basal area of common tree species	Basal area of all trees by size class*
1. Dune grass - cottonwood beach	1.14	0.00	0.00	0.00
2. Dry cottonwood sand dune	0.52	0.00	0.00	0.69
3. Sedge-rush swale	0.75	0.00	0.00	0.10
4. Dry juniper-cottonwood savannah	1.97	0.48	0.89	0.98
5. Tamarack - white cedar slough	2.63	1.70	1.85	1.04
6. White pine - white cedar forest	2.31	1.30	1.37	1.01
7. Sedge-tamarack dune pond	1.15	1.24	1.59	1.18
8. Birch-oak savannah and wetland	2.58	1.64	2.10	1.12
9. Red oak - basswood savannah	2.39	1.50	1.30	1.47
10. Red oak - sugar maple forest	2.42	1.03	0.94	1.30
Spearman rank correlation coefficients for ecological diversity (H')		$r_s = 0.84$ $r_s = 0.75$ $r_s = 0.68$ $r_s = 0.66$		

* For size classes, see section 1.1.

Table 15

Summary of statistics for marsh bird communities in four seral stages at Long Point

Feature	Cattail marsh	Wet grassy marsh	Dense grassy marsh - shrub carr	Wet woodland
Average density (No. of territories/km ²)	4312	809	578	1204
Total no. of species	5	16	10	31
Average species diversity (H')	0.60	1.76	1.51	2.78
Average equitability (J')	0.37	0.72	0.72	0.85

0.75, respectively). Tree species, in some respects, reflect size classes of trees, i.e. most cottonwoods are smaller than most oaks, but also reflect various growth forms. It is probably growth form that improves the correlation coefficients and this is a further indication that bird diversity is positively correlated with structural heterogeneity of habitat.

6.3. Succession of bird communities in marsh habitats

Before we begin our discussion of the patterns of marsh bird succession, it should again be pointed out that succession in aquatic habitat is complicated by a variety of factors,

particularly changes in water levels. Water level fluctuations and the corresponding changes in vegetation have been found to greatly affect bird communities (Aldrich 1943, Weller and Spatcher 1965, Brenner 1966, Verner and Engelsen 1970, Weller and Fredrickson 1973). In fact, it has been suggested that the main problem involved in a quantitative study of marsh birds is the marked influence that water levels have on the distribution and numbers of the birds (Dyrce and Tomilovic 1974). The pulse stability of shallow water systems results in patterns of succession that are in a state of continuous flux and this affects productivity and species

diversity in ways that are not fully understood. Long-term studies of marsh ecosystems are required before the successional development of marsh bird communities can be precisely stated. Our discussion, therefore, is necessarily simplified.

Table 15 summarizes features of the bird communities in each seral stage. Bird species diversity (H') and numbers of species generally increased with succession of the marsh habitats, although a small decline was noted in the dense grassy marsh - shrub carr stage. Equitability increased fairly steadily through the four stages. Territorial densities were maximal in the first stage (cattail marsh). They decreased as succession proceeded through the wet grassy marsh and dense grassy marsh - shrub carr stages, and then increased abruptly in the wet woodland stage.

Various studies have shown that although marshes are very productive, they have relatively few bird species (Tramer 1969, Short 1979), probably because marshes are, compared to forests, structurally simple. Nevertheless, different kinds of marshes have different structures and we expect to find that bird species diversity increases with structural heterogeneity. In marshes, this heterogeneity relates to the patchiness of the vegetation (horizontal differentiation), the layering of the vegetation (vertical stratification), and the interspersed of open water.

The water level in a marsh largely determines its character. In a study of Iowa marshes, Weller and Spatcher (1965) found that maximum bird numbers and diversity were reached when a well-interspersed cover to water ratio of 50:50 occurred. They found that the driest and wettest stages were the least productive of birds. The same general pattern occurs in the marshes of Long Point. The wet grassy marsh stage corresponds to Weller and Spatcher's "hemi-marsh" condition and it supported a relatively high density of birds and a high level of species diversity. The cattail marsh (wetter) and dense grassy marsh - shrub carr (drier) successional stages were characterized by relatively low levels of species diversity. The dense grassy marsh - shrub carr also had a low population density, as might be

expected from Weller and Spatcher's findings. Although the very high density of birds found in the cattail marsh seems at first to be a departure from what might be expected, it results largely from edge effect. Breeding density on this plot was also inflated because adjacent areas of open water were excluded from the determination of the plot's size.

The cattail marsh, although very productive, had very low levels of species diversity, species richness, and equitability (Table 15). The habitat was structurally simple and there were relatively few niches available. The domination of cattail was paralleled by the domination of one bird species, the Redwinged Blackbird.

The wet grassy marsh stage was very heterogeneous, quite unlike the simple structure of the cattail marsh. Although grasses and sedges predominated, stands of cattail, reed grass, and burreed also occurred, as well as numerous patches of open water. Thus, there was a vertical layering of the habitat as well as

a horizontal differentiation or patchiness. The general heterogeneity of the wet grassy marsh made this habitat suitable for a large number of marsh-nesting bird species. Bird species diversity and equitability were much greater here than in the cattail marsh (Table 15) and this is consistent with the hypothesis that diversity and habitat complexity are positively correlated.

In the next successional stage (dense grassy marsh - shrub carr), bird species variety was not as rich, and diversity levels declined slightly from those observed in the wet grassy marsh stage. Equitability, however, was similar in the two stages (Table 15). The dense grassy marsh - shrub carr was structurally simpler than the preceding stage. Grasses and sedges dominated the plant community to a greater extent and there was a lack of the patchiness and layering that was typical of the wet grassy marsh. Areas of open water and patches of large robust emergents such as cattail and reed grass were lacking, as



Table 16
Distribution of bird species in the succession of marsh habitats at Long Point

Bird species	Cattail	Wet grassy marsh	Dense grassy marsh - shrub carr	Wet woodland
Least Bittern	+	+		
Long-billed Marsh Wren	+	230		
Black Tern	290	4		
Common Gallinule	254	34		
Red-winged Blackbird	3659	280	209	73
Mallard	+	+	+	+
Virginia Rail		+		
American Coot		+		
Sora		+		
Blue-winged Teal		+		
Pied-billed Grebe		+		
Common Snipe		+	+	
Swamp Sparrow		117	191	
Common Yellowthroat		36	105	19
Common Grackle		10	14	250
Canada Goose		6	14	69
Starling			5	92
Eastern Kingbird			+	+
Song Sparrow			+	+
Tree Swallow				181
Mourning Dove				+
Prothonotary Warbler				+
House Wren				+
Blue-gray Gnatcatcher				+
Warbling Vireo				+
Great Crested Flycatcher				+
Brown-headed Cowbird				+
American Robin				+
Yellow-billed Cuckoo				+
Eastern Wood Pewee				+
Common Flicker				+
Red-headed Woodpecker				+
Downy Woodpecker				+
Cedar Waxwing				+
Red-eyed Vireo				+
Northern Oriole				+
American Redstart				+
Indigo Bunting				+
Great Horned Owl				+
Gray Catbird				+
Wood Duck				+
Cardinal				+

* Figures are average number of territories/km². Densities were calculated only for species having an average of three or more territories in any stage. The presence of less common species is indicated by "+" and these are arranged in descending order of abundance.

were the bird species normally associated with these habitats.

Finally, species richness, equitability, and diversity were greatest in the wet woodland stage (Table 15). This habitat had the greatest vertical stratification, thus providing a maximum choice of nesting sites — in different layers of the tree canopy, in the crotches of dead trees, in a variety of cavity types and sizes at various heights, in the understory, in the herbaceous ground cover, and at the bases of trees. The pools of open water provided additional attractions to waterbirds.

Results of the censuses conducted in each marsh seral stage are summarized in Table 16. Some species occurred in only one or two successional stages; others were found in three or four stages. Despite a certain amount of overlap in the bird communities, however, the densities of most bird species reached their maxima at various points along the successional gradient.

7. Preliminary estimates of bird population sizes in dune habitats at Long Point

Figure 5 (from Heffernan 1978) shows the general vegetation of Long Point; breeding-bird plots were located within most of these habitats. We determined the extent of the habitats by planimeter and assigned the census plots to various habitats on the basis of geographic position. We then computed preliminary estimates of population sizes of nesting species for each successional zone by multiplying densities, as determined by the breeding-bird censuses (males/km², Table 17), by the amount (in square kilometres) of habitat available. The total values for each census plot gave a preliminary population estimate for the dune habitats at Long Point.

The extrapolations apply to all terrestrial areas east of the Causeway (20.2 km², Table 18). Sloughs and other wetlands west of the sedge-tamarack dune pond, and all marsh areas east of the Causeway are excluded (these areas total about 39 km²). The Big Creek marshes, including the Hahn Woods and the

south beach west of the Causeway (approximately 10 km²) are also excluded.

There are several reasons why population sizes should be considered as preliminary estimates only. One is that sampling intensity (area of breeding-bird plot divided by area of corresponding Heffernan habitat) varied from 2 to 51% and averaged 5% (104 of 2021 ha, Table 18). Areas with low coverage and high densities of certain species probably result in less reliable estimates than opposite situations (high coverage, low densities). A second reason is that some plots were surveyed in only 1 year; the results are probably less reliable than those based on 2 or 3 years' data. Finally, there is undoubtedly some variability in the data due to the large number of observers gathering the information over many years. Although the observers were experienced, they may have interpreted instructions and bird behaviours differently. Therefore, we prefer to present these population estimates as rough approximations and have chosen order of magnitude as an appropriate scaling device.

Our estimates show the Redwinged Blackbird to be the most abundant species in dune habitats on Long Point (Table 19). This species was one of only two that maintained territories in every habitat surveyed (the other was Eastern Kingbird). Species with less than 10 estimated territories on Long Point can be regarded as uncommon because rare species are unlikely to be adequately sampled with breeding-bird census plot techniques. The annotated list provides further details on the breeding birds of Long Point.

Table 17
Densities (territorial males/km²) of breeding birds in dune habitats at Long Point

Successional stage	Early				Middle				Late		Disturbed areas*	
Zone	1	2	3	4	5	6	7	8	9	10	A	B
Species												
Spotted Sandpiper	8	-	-	-	-	-	-	-	-	-	-	-
Mallard	4	5	10	24	12	44	-	9	13	22	11	6
Redwinged Blackbird	4	10	29	48	130	17	393	94	273	87	52	12
Killdeer	2	-	-	-	-	-	-	-	-	-	-	6
Eastern Kingbird	2	2	5	15	52	8	31	47	50	37	7	8
Common Grackle	-	-	-	54	66	+	-	47	87	29	-	18
Field Sparrow	-	-	-	27	-	33	-	-	-	-	15	6
Brown Thrasher	-	-	-	24	+	-	-	-	-	-	-	12
Song Sparrow	-	-	-	21	43	-	10	-	23	-	-	-
Chipping Sparrow	-	-	-	18	27	93	+	-	-	-	-	-
Tree Swallow	-	-	-	12	33	-	31	278	140	36	7	6
Starling	-	-	-	12	27	-	10	26	50	-	-	6
Eastern Meadowlark	-	-	-	6	-	-	+	-	-	-	30	6
House Wren	-	-	-	-	63	141	-	81	67	160	-	-
Yellow Warbler	-	-	-	-	60	-	10	51	67	-	-	-
Northern Oriole	-	-	-	-	60	-	21	94	53	44	-	-
Great Crested Flycatcher	-	-	-	-	25	40	-	68	40	15	-	-
Eastern Wood Pewee	-	-	-	-	25	44	-	141	173	87	-	-
Cardinal	-	-	-	-	25	8	-	-	-	-	-	-
Black-capped Chickadee	-	-	-	-	22	50	-	-	-	-	-	-
Brown-headed Cowbird	-	-	-	-	19	-	-	17	7	-	-	6
Gray Catbird	-	-	-	-	16	17	-	43	-	-	-	-
American Robin	-	-	-	-	16	-	-	-	-	22	-	6
American Woodcock	-	-	-	-	11	-	-	-	-	15	-	-
Common Yellowthroat	-	-	-	-	11	35	31	85	57	22	-	6
American Redstart	-	-	-	-	11	-	-	-	-	7	-	-
Common Flicker	-	-	-	-	8	28	10	73	10	15	-	-
Indigo Bunting	-	-	-	-	8	13	-	-	-	-	-	-
Mourning Dove	-	-	-	-	5	28	-	-	-	7	-	12
Yellow-billed Cuckoo	-	-	-	-	5	-	-	47	7	-	-	-
Carolina Wren	-	-	-	-	5	-	-	-	-	-	-	-
Cedar Waxwing	-	-	-	-	5	-	-	-	7	-	-	-
Blue Jay	-	-	-	-	+	8	-	-	-	22	-	-
Rufous-sided Towhee	-	-	-	-	-	80	-	-	-	15	-	-
Whip-poor-will	-	-	-	-	-	17	-	+	-	-	-	-
Magnolia Warbler	-	-	-	-	-	8	-	-	-	-	-	-
Hairy Woodpecker	-	-	-	-	-	+	-	9	-	-	-	-
Downy Woodpecker	-	-	-	-	-	-	-	9	-	7	-	-
Red-eyed Vireo	-	-	-	-	-	-	-	26	-	29	-	-
Red-headed Woodpecker	-	-	-	-	-	-	-	9	13	-	-	-

cont'd on next page

Typical open habitat on Little Creek Ridge. Note browse line on cedar (photo: G. McKeating)

Table 17 cont'd

Densities (territorial males/km²) of breeding birds in dune habitats at Long Point

Successional stage	Early				Middle				Late		Disturbed areas*	
Zone	1	2	3	4	5	6	7	8	9	10	A	B
Species												
Blue-gray Gnatcatcher	-	-	-	-	-	-	-	13	-	-	-	-
Blue-winged Teal	-	-	-	-	-	-	-	-	7	22	-	-
Warbling Vireo	-	-	-	-	-	-	-	-	7	-	-	-
Black Duck	-	-	-	-	-	-	-	-	-	-	7	-
Marsh Hawk	-	-	-	-	-	-	-	-	-	-	7	-

* Plot A is the bluegrass-milkweed grassland and plot B is the recreational dune area.

Table 18

Breeding-bird census plots and corresponding habitats from Heffernan's (1978) vegetation map

Zone	Census plot/successional stage	Plot size (ha)	Corresponding Heffernan habitat	Estimated area on Long Point (ha)	Percentage censused
1	Dune grass - cottonwood beach	12.10	Beach	190	6.4
2	Dry cottonwood sand dune	10.52	Cottonwood savannah*	200	5.3
3	Sedge-rush swale	10.32	Cottonwood savannah*	74	13.9
4	Dry juniper-cottonwood savannah	8.30	Red cedar savannah	103	8.1
	Total early successional stages	41.24		567	7.3
5	Tamarack - white cedar slough	6.07	Lowland forest†	130	4.7
6	White pine - white cedar forest	4.00	Pine - white cedar forest	110	3.6
7	Sedge-tamarack dune pond	9.66	Lowland forest†	19	50.8
8	Birch-oak savannah and wetland	5.85	Birch-oak-pine forest	95	6.2
	Total mid-successional stages	25.58		354	7.2
9	Red oak - sugar maple savannah	7.50	Oak and oak-pine savannah	775	1.9
	Red oak - basswood savannah	7.50	Oak and oak-pine savannah		
10	Red oak - sugar maple forest	6.88	Oak-maple forest	84	8.2
	Total late successional stages	21.88		859	2.5
	Recreational dune area	8.55	Disturbed	209	4.1
	Bluegrass-milkweed grassland	6.68	Not described (burnt area)‡	32	20.9
	Total dune habitats	103.93		2021	5.1

* Based on personal observations. Heffernan's cottonwood savannah was apportioned as 200 ha dune and 74 ha swale.

† Based on comparison with aerial photographs. Heffernan's lowland forest was apportioned as 130 ha tamarack - white cedar slough and 19 ha sedge-tamarack dune pond.

‡ The approximate area of the burnt savannah (bluegrass-milkweed grassland) was determined from aerial photographs.



Table 19

Population estimates of birds in dune habitats at Long Point*

Numbers of territorial males			
1000 +	100-1000	10-100	0-10
Redwinged Blackbird	House Wren	Black-capped Chickadee	Magnolia Warbler
Eastern Wood Pewee	Common Grackle	Field Sparrow	Hairy Woodpecker
Tree Swallow	Yellow Warbler	Gray Catbird	Carolina Wren
	Northern Oriole	Blue-winged Teal	Black Duck
	Common Yellowthroat	Mourning Dove	Marsh Hawk
	Eastern Kingbird	American Robin	
	Starling	Cedar Waxwing	
	Great Crested Flycatcher	Warbling Vireo	
	Mallard	Brown Thrasher	
	Song Sparrow	Red-eyed Vireo	
	Common Flicker	Cardinal	
	Chipping Sparrow	Eastern Meadowlark	
	Red-headed Woodpecker	Blue Jay	
	Brown-headed Cowbird	American Woodcock	
	Yellow-billed Cuckoo	Indigo Bunting	
	Rufous-sided Towhee	American Redstart	
		Whip-poor-will	
		Killdeer	
		Downy Woodpecker	
		Spotted Sandpiper	
		Blue-gray Gnatcatcher	

* Within each order of magnitude, species are listed in decreasing order of abundance. A total of 13 310 territorial males were estimated to occur in dune habitats at Long Point.

Annotated list of the breeding birds of Long Point

This list includes 115 species of birds that are believed to have bred on Long Point. Of these, 98 are definitely known to have bred by the observation of active nests or flightless young. The remainder are presumed to have bred on the basis of frequent summer sight records (particularly if territorial or other breeding behaviours have been observed), together with a knowledge of the timing of migrations as deduced from LPBO records. Also considered were the wanderings of non-breeding birds, the availability of suitable habitat on the Point, the known breeding status of the species on the adjacent mainland (within 30 km of Port Rowan), and the breeding range of the species in Ontario as given by Godfrey (1966) and James *et al.* (1976).

A supplementary list of species believed to have bred on the adjacent mainland, but not on Long Point, is given in Table 20. There is a good possibility, however, that some of these mainland species do occasionally breed on Long Point. Species known to occur only as non-breeding summer visitors to Long Point are not included in either list. However, at least two visiting species, Black-crowned Night Heron (*Nycticorax nycticorax*) and Green-winged Teal (*Anas crecca*), may soon become established as breeding species.

The annotated list covers the whole of the Long Point peninsula and, at the base of the Point, includes all shoreline areas, marshes, and lowlands south of Regional Road No. 42 from the Port Rowan docks west to the Houghton Township line. The locations of most place names mentioned in the species accounts are shown on Figure 1.

1. Treatment, terms, and references

This list includes all breeding records known as of 31 December 1980. The common and scientific names of each species follow the American Ornithologists' Union Check-list (A.O.U. 1957) and its supplements (A.O.U. 1973, 1976). An asterisk (*) identifies those species for which positive breeding evidence has been obtained; species not so marked are presumed to breed.

A description of breeding abundance

and frequency is given below the name of each species. The classifications are modifications of the standards formulated by the Federation of New York State Bird Clubs (Arbib 1957), and refer to the recent status of the species on Long Point. When the status of a species has noticeably changed, the former status is also given in the introductory statement. Estimates of abundance are based on the breeding-bird censuses, other summer sight records, and our personal knowledge of Long Point. Definitions of the standards of breeding abundance are as follows:

Abundant	One pair per 0.5–2.0 ha
Very common	One pair per 3–10 ha
Common	One pair per 11–50 ha
Fairly common	One pair per 51–250 ha
Uncommon	One pair per 3–10 km ²
Rare	One pair per 11–50 km ²
Very rare	One pair per 50 km ² or more

These densities refer to the status of the species in its preferred habitat(s). They are not meant to indicate the average density of the species over the whole of Long Point. Also, to distinguish between species that are colonial, or for some other reason breed in concentrations in small disjunct areas, and those that are more evenly distributed, the modifier "locally" can precede the abundance terms given above. Frequency standards are as follows:

Regular	Breeds every year
Irregular	Breeds less than once every year, but no less than once in 5 years
Occasional	Breeds less than once in 5 years, but no less than once in 10 years
Sporadic	Breeds less than once in 10 years, but no less than once in 20 years
Casual	Breeds less than once in 20 years

Population trends, abundance relative to mainland populations, distribution on Long Point, habitat preferences, the number of nest records and details of some of these records are discussed in the species accounts. Informa-

Table 20

List of bird species known or presumed to have bred on the adjacent mainland but not on Long Point

* Hooded Merganser (<i>Lophodytes cucullatus</i>)
* Turkey Vulture (<i>Cathartes aura</i>)
* Broad-winged Hawk (<i>Buteo platypterus</i>)
* Bobwhite (<i>Colinus virginianus</i>)
Turkey (<i>Meleagris gallopavo</i>)
* Upland Sandpiper (<i>Bartramia longicauda</i>)
* Rock Dove (<i>Columba livia</i>)
* Long-eared Owl (<i>Asio otus</i>)
Common Nighthawk (<i>Chordeiles minor</i>)
* Ruby-throated Hummingbird (<i>Archilochus colubris</i>)
Pileated Woodpecker (<i>Dryocopus pileatus</i>)
* Rough-winged Swallow (<i>Stelgidopteryx ruficollis</i>)
* Red-breasted Nuthatch (<i>Sitta canadensis</i>)
Wood Thrush (<i>Hylocichla mustelina</i>)
* Hermit Thrush (<i>Catharus guttatus</i>)
Veery (<i>Catharus fuscescens</i>)
Golden-crowned Kinglet (<i>Regulus satrapa</i>)
* Loggerhead Shrike (<i>Lanius ludovicianus</i>)
* White-eyed Vireo (<i>Vireo griseus</i>)
Yellow-throated Vireo (<i>Vireo flavifrons</i>)
Black-and-white Warbler (<i>Mniotilta varia</i>)
* Golden-winged Warbler (<i>Vermivora chrysoptera</i>)
Blue-winged Warbler (<i>Vermivora pinus</i>)
* Nashville Warbler (<i>Vermivora ruficapilla</i>)
Cerulean Warbler (<i>Dendroica cerulea</i>)
* Chestnut-sided Warbler (<i>Dendroica pensylvanica</i>)
* Prairie Warbler (<i>Dendroica discolor</i>)
* Ovenbird (<i>Seiurus aurocapillus</i>)
Mourning Warbler (<i>Oporornis philadelphia</i>)
* Yellow-breasted Chat (<i>Icteria virens</i>)
* Orchard Oriole (<i>Icterus spurius</i>)
Scarlet Tanager (<i>Piranga olivacea</i>)
Purple Finch (<i>Carpodacus purpureus</i>)
Grasshopper Sparrow (<i>Ammodramus savannarum</i>)
* Lark Sparrow (<i>Chondestes grammacus</i>)
Dark-eyed Junco (<i>Junco hyemalis</i>)
* Clay-colored Sparrow (<i>Spizella pallida</i>)

* Denotes definite evidence of breeding within 30 km of Port Rowan.

tion from the breeding-bird censuses has been incorporated wherever possible. For each species, *maximum* densities (maximum number of territories/km²) are listed for those plots on which more than three territories were held in at least one study year. Plots on which a species has occurred in low numbers, i.e. three or fewer territories, are listed without reference to actual densities.

When sufficient data were available, we calculated a range of egg dates; these are given at the end of each species account. Information on incubation periods was taken from Godfrey (1966) and was often used to approximate dates of egg laying or hatching. The data were treated such that the final statement reflected the *minimal* range of egg dates. Thus, some nests may contain eggs outside the range of dates we have given. We stress that the initiation and length of the nesting season varies from year to year in accordance with weather conditions. Also, the cooling influence of Lake Erie is more pronounced at the tip of Long Point than it is at the base, and this results in inter-area differences in nesting chronology. Spring temperatures are cooler at the tip than at the base; hence, egg laying may be retarded by a week or more at the end of the Point.

Abbreviations have been used as follows: Canadian Wildlife Service (CWS), Ontario Ministry of Natural Resources (OMNR), Long Point Bird Observatory (LPBO), and Ontario Nest Records Scheme (ONRS). References to the unpublished diaries, notebooks, and letters of L.L. Snyder, J.L. Baillie, W.E.C. Todd, and A.W. Preston, are indicated by (MS) after their names. Direct personal communications of records are attributed to the name of the correspondent followed by (pers. commun.), unless employment with the CWS or OMNR is recognized, in which case the affiliation is noted instead. Records found only in LPBO logs and banding records are indicated by (LPBO) plus the name of the observer when known. Nest records found in the ONRS are identified by the name of the observer followed by (ONRS), even though the record may also appear in other unpublished documents. Records indi-

cated by (LPBO, ONRS) are those that have been contributed to the ONRS by an unidentified LPBO observer. By using the name of the observer wherever possible, we have achieved as much clarity as we can in distinguishing between individual record cards filed in the ONRS. Unfortunately, however, this format does not properly acknowledge the outstanding nest record card contributions that LPBO has made to the ONRS over the past 20 years. Approximately 80% of the total number of cards in the ONRS for the Long Point region have been the result of LPBO field work, and this organization remains as one of the largest contributors to the Scheme in Ontario (Peck 1979).

2. Species accounts

*Common Loon (*Gavia immer*)

Very rare and casual; formerly probably more common.

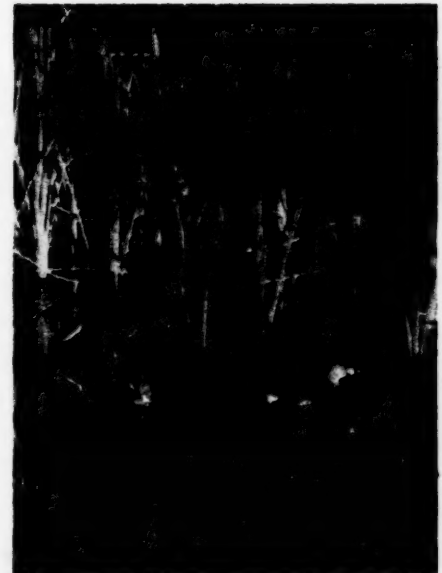
Fishermen informed Snyder (1931) that this species formerly nested on some of the islands of the Long Point Company Marsh. The only other evidence for breeding is an observation of an adult with a brood of very small young in the vicinity of Pottohawk Point in the summer of 1975 (B. Malcolm, OMNR).

The loon is more common as a non-breeding summer visitor to Long Point than it is as a nesting species. Sightings are often of birds in winter or sub-adult plumage, frequently in the vicinity of Ryersons Island and Courtright Ridge. Loons were present in that area throughout June and July of 1978; a maximum of 27 were counted between the base of the point and Courtright Ridge on 20 June but only one of these birds was in breeding plumage (E. Nol, LPBO).

*Pied-billed Grebe (*Podilymbus podiceps*)

Fairly common and regular.

Snyder (1931) reported that the Pied-billed Grebe occurred sparingly in the marshes of Long Point. It is still uncommon in many parts of the marshes and may even be absent in some years, particularly when water levels are low. Deep water cattail marshes containing sheltered pools and ponds are favoured for



nesting. The Pied-billed Grebe has been recorded as a breeding species in only one census plot, the wet grassy marsh.

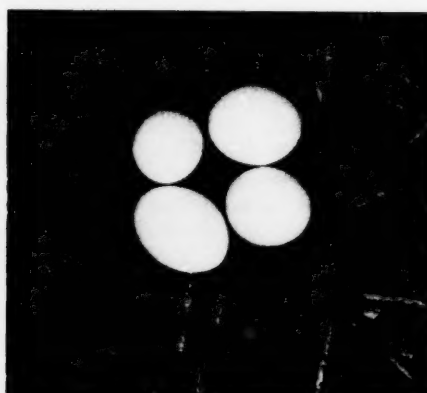
There are nine nest records, the first on 2 June 1927 near Second Island (L.L. Snyder, ONRS). Egg laying usually begins in the first week of May.

Egg dates: 24 April – 9 June

*Great Blue Heron (*Ardea herodias*)

Formerly locally common and regular; now rare and occasional.

The Great Blue Heron is much more common as a summer visitor to Long Point than it is as a breeding species. A colony in the Hahn Woods at the base of the Point was first reported on 30 May 1937 (G. North, pers. commun.). In 1949, this colony contained an estimated 60 nests (G. North, pers. commun.) and it was last reported active on 13 May 1957 (J.L. Baillie, ONRS). We have another report, however, that indicates it became re-established for a short period in the 1970s. G. McCullough (CWS) visited the Hahn Woods in the winter of 1975 and found white-washed nests in the trees. Although storms later destroyed the nests, it is possible



that the Hahn Woods will support another heronry in the future. In 1980 one pair nested east of Cedar Creek Ridge; at least one young was seen in the nest on 26 May (J. Planck, CWS).

Heronries have been reported from the adjacent mainland. Snyder (1931) reported one, now apparently deserted, about 20 km north of Port Rowan at Walsingham. At present there is a colony of about 135 nests near Nanticoke (Quinney *et al.* 1979). It is likely that many of the herons now seen at Long Point are visitors from there.

*** Green Heron (*Butorides virescens*)**

Fairly common and regular; formerly rare.

Snyder (1931) reported that the Green Heron was a rare summer resident on Long Point. It is now fairly common in and around the swamps and ponds where it probably nests in buttonbush and willow thickets. There are six nest records, the first being of a nest containing five eggs in a buttonbush near the Gravelly Bay Road on 19 June 1974 (LPBO, ONRS). Three nests, each with four broken eggs, were found in a spruce plantation on Courtright Ridge on 22 June 1978 (LPBO). A nest was also reported near the Provincial Park in the summer of 1978 (LPBO). A nest found under construction on 10 May 1980 in a pine plantation in the Provincial Park was later deserted (J. McCracken).

*** Least Bittern (*Ixobrychus exilis*)**

Common and regular.

The Least Bittern is common in suitable marsh habitat, but it is highly secretive and not often observed. It prefers to nest in stands of tall, robust emergent vegetation in wet marshes; cattail beds are especially favoured. It has been reported from both the cattail marsh and wet grassy marsh census plots.

There are 26 nest records, the first on 12 June 1927 near Second Island (J. Edmonds, ONRS).

Egg dates: 19 May – 28 June

*** American Bittern (*Botaurus lentiginosus*)**

Common and regular.

Although this species is more generally distributed than the Least Bittern, it is probably not quite as common. It occurs in most marsh habitats, including those in the interior of the Point. The only census plot on which territories have been recorded was the intergrading dune-swale-savannah. It was also a regular visitor to the wet grassy marsh and dense grassy marsh – shrub carr plots.

There are 18 nest records, the first on 7 June 1927 near Second Island (J.L. Baillie, ONRS). Fledglings have been observed on two occasions; one was banded at the eastern end of the Point on 12 July 1967, and one was seen at Courtright Ridge on 13 July 1971 (LPBO).

Egg dates: 7 May – 5 July

*** Mute Swan (*Cygnus olor*)**

Locally rare and irregular (introduced).

The status of this species at Long Point is not clear because of the difficulty in identifying feral birds. D. Dennis (CWS) informs us that feral swans nested at the northeastern end of the Causeway in the early 1970s. Mrs. N. Jones has photographs taken sometime around 1974, from the same location, of adults with two cygnets. There are other similar recent records, but to what extent the population is wild is still a matter of conjecture. Sightings have been restricted to the marshes surrounding the Causeway and along the north shore of the Inner Bay, east to St. Williams. Wing-clipped birds are known to have bred successfully east of the Port Rowan dock in 1979. A. Wormington (pers. commun.) has recorded feral birds from the area adjacent to the Causeway on several occasions, including the following dates: 27 April – 19 May 1969, 18 April 1970, 5 July 1970, 11 July 1970, and 1 May 1971.

*** Canada Goose (*Branta canadensis*)**

Very common and regular (introduced).

Canada Geese probably nested in the Long Point region until about the mid-19th century. At that time, the population was of the Giant race (*B.c. maxima*). This race became seriously depleted throughout its breeding range and for a time was considered extinct (A.O.U. 1957). Following its rediscovery in 1962 (Hanson 1965), it has been successfully re-introduced in many locations throughout its former range.

In the early 1960s, Mr. Lee Brown obtained about 25 pairs of geese (*B.c. maxima*) and kept a flock on his farm west of Port Royal. In the following years, more birds were obtained, and the original flock began to breed in the local marshes; three goslings were noted at the Big Creek Marsh in 1963 (M. Field, LPBO). By 1969, the total population was estimated at 100–200 birds.

The re-introduction program initiated by Lee Brown has proven very successful. The resident population has been steadily dispers-

ing eastward through the marshes and on to Long Point itself. The first nesting on the eastern portion of the Point was reported in 1975, when a brood was seen on 21 May near Courtright Ridge (G. Miller, LPBO). Another brood was observed a few days later near the tip of the Point (R. Purtil, LPBO). In spite of the expansion, populations are still much greater at the base of the Point than they are on the eastern sections.

The size of the breeding population at Long Point has been difficult to monitor because of local expansion of the flock and the summer movements of non-breeding birds. LPBO conducted a preliminary breeding survey of the species in 1974, and estimated about 100 adult geese in the area. Flock-size has probably remained fairly stable at 100–200 adult birds at the base of the Point. Including sub-adult birds, however, the resident population may include as many as 2000 birds (Reid 1979).

Canada Geese can be found nesting in all marsh habitats at the base of the Point, but prefer areas with good visibility. Nests are commonly constructed on top of muskrat lodges, berms, or other elevated areas. In the Hahn Woods, nests are on earthen hummocks at the bases of flooded trees. Densities on the wet woodland census plot have been as high as 92 territories/km². Nesting geese also occurred in the wet grassy marsh and dense grassy marsh – shrub carr plots.

Egg laying begins about the middle of April and most eggs have hatched by the end of May. We are aware of 36 records of nests, and many more records of broods.

Egg dates: 14 April – 25 May

*** Mallard (*Anas platyrhynchos*)**

Very common and regular; formerly rare.

Snyder (1931) reported that the Mallard was a rare summer resident at Long Point. Populations have increased noticeably in southern Ontario (de Vos 1964), however, and the Mallard is now the most common nesting duck on the Point. It is widespread and evenly distributed; territories were reported from every breeding-bird census area

with the exception of the sedge-tamarack dune pond. It prefers to nest at the edges of ponds and marshes, but can also frequently be found at considerable distances from water. There are well over 100 nest records, all of them fairly recent. The first nesting was reported on 20 May 1950 at the Provincial Park (G. North, pers. commun.).

Egg dates: 1 April – 8 July

*** Black Duck (*Anas rubripes*)**

Uncommon and regular; formerly common.

The Black Duck was formerly the most common duck species at Long Point (Snyder 1931). Populations have declined markedly in southern Ontario (Alison 1976) and elsewhere in eastern North America (Johnsgard and DiSilvestro 1976). The decline may be linked to the concurrent expansion and increase of Mallard populations; it seems likely that the relatively specialized Black Duck will continue to become rarer due to increased competition and hybridization with the more adaptable Mallard (Johnsgard and DiSilvestro 1976).

The Black Duck has been reported as a territorial species from only one breeding-bird census area, the bluegrass-milkweed grassland. There are 22 breeding records, the first being of a brood seen near Port Rowan on 15 July 1907 (W.E.C. Todd, MS). The first nest record was on 26 May 1927 on Second Island (J.L. Baillie, ONRS). Only eight breeding records have been reported from Long Point in the last 10 years.

Egg dates: 8 April – 16 June

*** Gadwall (*Anas strepera*)**

Rare and irregular; formerly absent.

This species has experienced recent range expansions into eastern North America (Bellrose 1976) and may be expected to become progressively more common in the Long Point region. There are only two nest records:

17 June 1976 – nest containing eight eggs about 6 km east of the Provincial Park (LPBO, ONRS).

Summer 1976 – nest on a grassy berm at the mouth of Big Creek (P. Madore, CWS).

*** Pintail (*Anas acuta*)**

Very rare and casual; formerly absent.

Pintails have expanded their breeding range eastward into the Great Lakes region during the present century (de Vos 1964). The only breeding record for Long Point is an observation of a female with a brood of four young in the Big Creek Marsh Unit in the summer of 1975 (G. McCullough, CWS). Summer sight records are few; two on 6 July 1972 near the end of the Point (LPBO), five on 7 June 1975 east of the park, and one on 7 July 1976 (A. Wormington, pers. commun.).

*** Blue-winged Teal (*Anas discors*)**

Common and regular; formerly rare.

Snyder (1931) reported that this species only occasionally bred in the region. A.W. Preston (MS) noted its summer absence from the Port Dover area as recently as 1956. Populations have increased substantially, however, and the Blue-winged Teal is now the second most common nesting duck species at Long Point. It nests in wet meadows, along the grassy edges of marshes and ponds, and often on lawns in the cottage areas.

The Blue-winged Teal is not widely distributed on Long Point and has only been found on six census plots; red oak – sugar maple forest, red oak – basswood savannah, intergrading dune-swale-savannah, and three of the plots in the wet grassy marsh. All records strongly indicate that it is most common towards the base of the Point. At least 36 of the 46 nests reported for Long Point were west of Squires Ridge. Studies conducted by the OMNR (unpubl. data) in the Crown Marsh in 1977 suggested that the Blue-winged Teal was even more common there than the Mallard.

The Blue-winged Teal was first reported breeding at Long Point by Munroe (1965), who noted a brood at Courtright Ridge in 1961.

Egg dates: 19 April – 21 July

*** American Wigeon (*Anas americana*)**

Very rare and casual.

D. Brown (CWS) recalls finding a nest with eggs near the mouth of Big Creek in 1976. There are a few additional summer records of adult birds on the Point (A. Wormington, pers. commun.; D. Umpherson, CWS).

*** Northern Shoveler (*Anas clypeata*)**

Very rare and casual.

This is another western duck species that has expanded its range into the Great Lakes region during the present century (de Vos 1964). In 1927, C.H. Ferris informed J.L. Baillie (MS) that a few shovellers nested in the marshes around Ryersons Island. There is only one documented nesting for Long Point; a nest containing nine eggs, on 12 June 1977 about midway between the Provincial Park and Courtright Ridge (Goodwin 1977b; R. Curry, pers. commun.).

*** Wood Duck (*Aix sponsa*)**

Fairly common and regular.

Although the Wood Duck breeds fairly commonly in flooded woodlands and sloughs at Long Point, nests are seldom found because of the species' somewhat secretive nesting habits and the inaccessibility of its cavity nest-sites. Most breeding records refer to sightings of broods. Snyder (1931) noted several broods during his visits to Long Point in 1927. Other records are: two broods near Courtright Ridge in 1961 (Munroe 1965), one brood near the Causeway on 22 June 1963 (M. Field, LPBO), one on 30 June 1963 (G. North, pers. commun.), one in the Big Creek Marsh on 10 July 1963 (M. Field, LPBO), one on 2 July 1979 in Duncans Pond (D. Umpherson, CWS), and one at the edge of the Causeway on 3 July 1979 (J. McCracken).

The CWS initiated a Wood Duck nestbox program in the Hahn Woods in 1977 and one nest was reported there in 1978 and 1979 (P. Madore, CWS). Boxes have also been erected on Courtright Ridge by LPBO and in a slough about 4 km from the end of the Point by CWS. In 1980, one of these boxes was utilized (10 June, 11 eggs,

K. Dewey, CWS). Other records are:

24 May 1969 – nest containing at least one egg near the Gravelly Bay Road (J. Bradshaw, ONRS).

9 June 1974 – adult female at a nest in a slough about 4 km from the end of the Point (G. Miller, LPBO).

*** Redhead (*Aythya americana*)**

Uncommon and irregular; formerly absent.

This species is sparsely distributed in southern Ontario but it may be locally common in some areas (e.g. Lake St. Clair). The cattail marshes at Long Point offer more suitable nesting habitat for this species than do the grassy marshes at the base of the Point. The first breeding record is of a nest containing 10 eggs, found in the Long Point Company Marsh on 16 June 1961 (C.M. Young, ONRS). In September 1976, about 50 birds were introduced by the OMNR (D. Dennis, CWS) and the species seems to be better established in the area as a result (Wm. Lipsit, pers. commun.). One brood was seen in the Crown Marsh in 1978 (C.D. Ankney, pers. commun.). Three broods were also seen in the Company marshes in 1978 (G. McCullough, CWS) and again in 1979 (D. Umpherson, CWS). A pair was seen at Little Rice Bay on 11 July 1980 (P. Tucker, CWS).

*** Red-breasted Merganser (*Mergus serrator*)**

Very rare and occasional; formerly absent.

This species is more common as a non-breeding summer visitor at Long Point than as a breeding species. Birds in moult are sometimes recorded in the summer at the tip of the Point, where they "loaf" and roost. Summering birds are also sometimes reported from the Courtright Ridge area. In 1978, two birds were seen there on 24 June, seven on 15 July, and six on 20 July (LPBO).

There are two reports of broods in the Gravelly Bay area. On 10 July 1966, what appeared to be an adult with four young was reported by G. Page (LPBO). More recently, D. Umpherson (CWS) reported an adult

female with two small young on 16 July 1979 near Duncans Pond. These records are about 300 km south of the species' normal breeding range (Godfrey 1966).

*** Red-tailed Hawk (*Buteo jamaicensis*)**

Rare and irregular.

The Red-tailed Hawk is probably more common on adjacent sections of the mainland than on Long Point. There is only one breeding record; a nest with three young on 15 May 1976 in the vicinity of the Old Gravelly Bay Road (M. Bradstreet, LPBO). Two birds regularly visited the Bluegrass-Milkweed Grassland census plot in 1974 and may have nested nearby (LPBO). Another pair was noted at Anderson Pond on 1 June 1975 (LPBO). In 1980, one was seen over Duncans Pond on 11 July 1980 (D. Kroetsch, CWS) and a pair was regularly reported from the Squires Ridge area (CWS).

*** Bald Eagle (*Haliaeetus leucocephalus*)**

Formerly uncommon and regular; now very rare and occasional.

The Bald Eagle was once common in southern Ontario, but populations have declined drastically and the species is now officially protected under the provincial Endangered Species Act. Weekes (1974) investigated the recent breeding status of the Bald eagle in southern Ontario and concluded that there were at least 100 active nests up to about 1950. She notes that perhaps twice that number occurred at the turn of the century and estimated that a density of about one nest per two kilometres would probably have prevailed in many areas along the shore of the lower Great Lakes.

Although the species was nearing the bottom of its decline in the early 1960s, there were still as many as five active nests on Long Point at that time. By the late 1960s, however, there was no definite evidence of nesting (Holroyd and Wasserfall 1969). The last two active nests were reported in 1963 (G. Peck, ONRS). There is a good possibility that later nestings have taken place, or will take place in the future, as adult eagles are still observed fairly regularly on Long Point



during the breeding season (Hussell 1975, Risley 1978). For example, M. Bradstreet found an adult on a nest in a pine on the Burnt Ridges on 6 April 1974; on 13 May, A. Wormington saw two adults at this site. Later that summer, O. Williams (OMNR) observed two adults and what he believed to be two young of the year together in a tree on the Little Creek Ridges. In May 1975, he found two adults at the nest on the Burnt Ridges. One of the birds was sitting on the nest, but no young were seen. This nest later blew down in the winter of 1977-78.

The cause for the decline of the Bald Eagle at Long Point is unclear; it is probably linked with reproductive failures caused by severe contamination with pesticides and PCBs. Increased disturbance of shoreline nests by boaters may have compounded the problem in recent years. Some Bald Eagles do not tolerate high levels of human activity (Beebe 1974), and Weekes (1974) has suggested that human disturbance of nest sites has reduced nesting activity in southern Ontario.

In conjunction with the OMNR, the LPBO has regularly monitored the status of the Bald Eagle at Long Point over the past 20 years. At least 22 former nest sites are known and in many cases the nests are still intact. G. North informs us that three or four nests could formerly be counted from the Causeway at the base of the Point. One of these nests was present in the Big Creek Marsh area as recently as 1948 (J.L. Baillie, ONRS). At least two nests were situated near the Provincial Park (J.L. Baillie, ONRS). All other nests found were between Ryersons Island and Bluff Point. Five more nestings have been reported from areas of the adjacent mainland (Turkey Point, Port Ryerse, and Forestville — ONRS).

The contents of only seven nests in the Long Point region have been reported. These records indicate that nesting begins in late March or early April and evidently extends well into the summer, young having been noted in the nest as late as 19 July on the mainland.

25 May 1927 — two young in a nest in a cottonwood on Ryersons Island were still present on 2 June (J.L. Baillie, ONRS).

12 May 1928 — two young in a nest in a cottonwood on Ryersons Island (L.L. Snyder, MS).

26 April 1941 — nest containing two eggs at Turkey Point (H.M. Halliday, ONRS).

16 July 1941 — nest containing three young 2 km west of Port Ryerse still contained young on 19 July (J.M. Speirs, ONRS).

5 May 1962 — one dead young in a nest in a white oak on the Burnt Ridges (G. Peck, ONRS).

7 April 1963 — nest in a red oak on the Little Creek Ridges containing one egg, later found deserted (G. Peck, ONRS).

13 April 1963 — one badly broken egg in a nest in a red maple on Squires Ridge (G. Peck, ONRS).

* Marsh Hawk (*Circus cyaneus*)

Rare and irregular.

This species nests in the wet meadows and marshes of Long Point, but it is not common or regular and its numbers probably decline in high water years. It has been found

on only one census area, the bluegrass-milkweed grassland. There are only three nest records:

4 June 1927 — nest containing five eggs near Second Island (J.L. Baillie, ONRS).

10 June 1973 — nest containing seven eggs on the bluegrass-milkweed grassland census plot (W. Joyce, LPBO).

5 May 1974 — nest under construction in the Big Creek marshes; contained five eggs (plus one duck egg) on 18 May (J. Bax, ONRS).

Osprey (*Pandion haliaetus*)

Very rare and casual.

Snyder (1931) believed that this hawk was formerly established as a summer resident on Long Point in the early 19th century. The only other report to suggest that it has bred on the Point comes from J. McNally, who informs us that he found it nesting in the vicinity of Gravelly Bay in the late 1930s. Single birds were seen at two locations in July 1980 (S. McAdam and P. Tucker, CWS).

* American Kestrel (*Falco sparverius*)

Rare and irregular.

This species is more common on the adjacent mainland than on Long Point. It is of fairly regular occurrence in the summer, and probably nests in tree cavities in open habitats on Long Point. Most summer sightings are for areas east of the Gravelly Bay Road; some recent records are 6 July 1970, 8 June 1971, 17 June 1972, and 10 July 1978 (LPBO). A pair was also noted throughout most of the summer of 1979 around the Gravelly Bay Road (S. Flynn, CWS). In 1980, a pair of kestrels raised four young in a Purple Martin house at the tip of the Point. LPBO has erected several kestrel nestboxes in scattered locations on the adjacent mainland a few kilometres north of Port Rowan. Two of these boxes contained young birds on 24 June 1979 (LPBO).

* Ruffed Grouse (*Bonasa umbellus*)

Locally uncommon and irregular.

Snyder (1931) found that the Ruffed Grouse was either completely extirpated, or nearly so, on the Point. He concluded that the

area had been made so barren by browsing deer that it could no longer support grouse. Suitable habitat (e.g. second growth woodland and thickets) is still very restricted on the Point. There are three sightings from the Gravelly Bay area: 12 July 1965, 14 May 1966, and 10 May 1974 (LPBO). Ruffed Grouse are apparently more numerous at certain locations at the base of the Point, particularly in the pine plantation south of the Flight Club Marsh. The only breeding record is of a nest containing five eggs on 12 May 1973 at the edge of the Big Creek Marsh (J. Bax, pers. commun.). This species is much more common on the adjacent mainland.

*** Ring-necked Pheasant (*Phasianus colchicus*)**

Locally fairly common and irregular (introduced).

Introductions of this species in the region are poorly documented. Snyder (1931) makes no mention of the pheasant at Long Point and we assume that it has been introduced only fairly recently. It is known to have been established as a breeding species at Turkey Point in 1933 (C.E. Hope, ONRS) and it probably appeared at Long Point shortly afterwards. Our first report of the species at Long Point is of 40 birds released by the Big Creek Shooting Club at the base of the Point on 10 July 1963 (M. Field, LPBO). The Long Point Company released about 500 birds on Courtright Ridge and about 200 birds on Ryersons Island in 2 years in the mid-1970s. Survival of these birds, however, was extremely poor, partly due to predation by raccoons (Wm. Lipsit, pers. commun.). The OMNR has recently released about 30 birds a year in the Provincial Park at Long Point, as well as some in the Hahn Marsh area (D. Reid, OMNR).

Birds have been reported almost to the eastern end of the Point, but the largest populations are in the vicinity of Courtright Ridge and the Provincial Park. The only breeding record is of a nest containing 10 eggs just east of the Provincial Park on 18 May 1972 (A. Wormington, ONRS). G. McCullough (CWS) reports seeing several

"dumped" eggs along a berm in the Hahn Marsh in 1975. Nearby on the mainland, a family of birds was reported at the Backus Conservation Area on 11 July 1976 (E. Nol, LPBO).

*** King Rail (*Rallus elegans*)**

Rare and irregular.

W.E.C. Todd (MS) believed that he had seen a King Rail in the main marshes on 12 July 1907. Snyder (1931) believed that this species nested on the Point and he had been told of a brood seen near "the cottages" during the summer of 1926. It was not until 1968, however, that a nest was found (LPBO).

Records indicate that this species is unevenly distributed at Long Point. All recent sightings are in two general areas: the wet sedge meadows in the vicinity of the Provincial Park and in similar habitat near the eastern end of the Point. There are five breeding records, only two of which are of nests: 26 June 1967 – adult with three young about 1 km from the eastern end of the Point (LPBO).

14 July 1968 – nest containing five eggs near the end of the Point; contained eight eggs on 17 July (M. Bradstreet, ONRS).

2 August 1969 – adult with three young at the end of the Point (LPBO).

12 July 1971 – nest containing one egg and one young near the end of the Point (LPBO, ONRS).

Summer 1976 – adult with 13 young at Long Point Beach (R. Copeland, pers. commun.).

*** Virginia Rail (*Rallus limicola*)**

Common and regular.

This species is uncommon in the outlying marshes of Long Point, but is common in the Big Creek Marsh Unit at the base of the Point. Virginia Rails seem to favour small dense stands of cattail in wet grassy marshes.

Nests are difficult to locate and only eight have been reported, all recently and all in the marshes at the base of the Point. The first breeding record was of a nest containing 10 eggs on 25 May 1969 (J. Bax, pers.

commun.). Mr. Bax also reports two nests containing eggs on 26 May 1974. The remaining five nests were all found in the Big Creek Marsh Unit in 1978 and 1979 (J. McCracken, ONRS).

Egg dates: 11 May – 14 June

*** Sora (*Porzana carolina*)**

Common and regular.

Soras become plentiful in the marshes in early May, but many of these birds apparently do not remain to nest. The species is probably more common in the marshes at the base of the Point than in those farther east. An ample water cover is required and grassy marshes interspersed with cattail are apparently favoured.

Nests are difficult to locate and there are only eight records, the first being 17 June 1927 near Second Island (J.L. Baillie, ONRS). No other breeding records were reported until 1973 when a nest containing four eggs was found on 12 May at the base of the Point (J. Bax, pers. commun.). In May of the following year, Mr. Bax found four more nests with eggs. One nest was found in the Big Creek Marsh Unit on 26 May 1978 (J. McCracken, ONRS), and a second on 8 June 1979 (J. Robinson, ONRS).

Egg dates: 3 May – 17 June

*** Common Gallinule (*Gallinula chloropus*)**

Abundant and regular.

This is the most common and widespread rail species at Long Point. The gallinule is a semi-colonial nesting species, favouring stands of cattail and burreed in openings in the marsh. It needs areas of open water, and populations probably decline in low water years. The greatest densities were reported from the cattail marsh (250 territories/km²) and the wet grassy marsh census plots (55 territories/km²).

There are over 40 breeding records, the first being a nest containing four eggs on 1 June 1927 in the marshes near Second Island (J.L. Baillie, ONRS).

Egg dates: 1 May – 1 July



*** American Coot (*Fulica americana*)**

Locally uncommon to common and regular.

W.E.C. Todd (MS) reported this species on 12 July 1907 in the Long Point Company Marsh. Snyder (1931) regarded the coot as a rare summer resident. It is now common but its populations fluctuate widely as the quality of its habitat varies. Like the gallinule, the coot prefers interspersed stands of cattail and burreed. Expanses of open water are of greater importance to coots, however, and populations are apparently quite sensitive to annual fluctuations in water level. It is also a semi-colonial species and may be absent from large expanses of the marshes. The greatest density found on a wet grassy marsh census plot in the Big Creek Marsh was 50 territories/km².

There are 19 breeding records, the first being a nest reported by Young (1961) in the Long Point Company Marsh. No other nests were reported until 1974, when nine were found by J. Bax (pers. commun.). A brood was seen on 22 July 1977 in the Crown Marsh (OMNR, unpubl. data). J. McCracken found six nests and one brood in 1978 in the Big Creek Marsh Unit. In 1979, however, only one nest was found there (C. Flynn, ONRS), in spite of extensive field work.

Egg dates: 27 April – 13 June

*** Piping Plover (*Charadrius melodus*)**

Formerly common and regular; now uncommon, irregular, and declining.

The Piping Plover has disappeared over most of its range in Ontario and it is now officially listed as an endangered species in the Province. Long Point is one of the very few remaining possible breeding locations for the species in Ontario.

At the turn of the century and probably at least until the 1940s, the Piping Plover was remarkably common at Long Point.

W.E. Saunders (ONRS) collected six sets of eggs on 19 May 1905. Two years later, W.E.C. Todd (MS) described the species as being "very plentiful" along the south beach. On 30 May of the following year, W.E. Saunders collected eight more sets of eggs. Mr. G. North (pers. commun.) recalls being able to find a pair of Piping Plovers every few hundred metres along the beach at the base of the Point around 1924. On 27 June 1927, as many as 10 pairs were observed along the beach in the Courtright Ridge area (J.L. Baillie, MS). On 7 May of the following year, L.L. Snyder (MS) counted 35 or 40 birds on a small section of beach near Courtright Ridge and collected 9 of them. On the basis of observations made in 1927–28, Snyder (1931) later estimated a total breeding population for Long Point of about 100 pairs. Sheppard (1935) adds further evidence to support these numbers. On 20 July 1933, he noted about 50 birds at one location.

Despite its long stretches of relatively undisturbed beaches, only a remnant of the population remained by 1960 (Hussell and Montgomerie 1966). Further declines have been documented by the LPBO over the past 20 years and the prospects for the survival of the species at Long Point are not favourable.

At least 19 young hatched in 30 known nestings between 1961 and 1965, but the fate of many of the clutches was not known (Hussell and Montgomerie 1966). Of 21 nestings from 1966 to 1975, at least one chick hatched in 12 nests, 8 nests were known or believed to have been unsuccessful, and the outcome of the remaining nest was unknown (Cartar 1976). In 1976, there were six



nestings (by three to five pairs of adults), only one of which hatched young (Miller 1978). In addition to the breeding adults, there were unpaired individuals in the area. In 1977, two young hatched from the only nest, but it is believed they did not survive (Miller 1977). In addition to the breeding pair in 1977, six males maintained territories but failed to mate. A similar situation occurred in 1978; although three males held territories they all failed to attract mates and no nestings occurred (Lambert and Nol 1978). No nestings were attempted in 1979 or 1980 and a shortage of females is currently the primary factor limiting reproduction.

Predation and disturbance of nests by gulls has possibly been a major factor in the decline of Piping Plovers on Long Point in the past 20 years (Cartar 1976, Miller 1977, Lambert and Nol 1978). Ring-billed Gull populations have increased markedly around the Great Lakes during this period (Ludwig 1974), and Long Point is a major summering area for the species.

Human disturbance and vehicular traffic are minimal on Long Point and are not likely to have contributed to any great extent to the decline in the Piping Plover population. Although high lake levels and the subsequent changes in beach structure may have been partially responsible for earlier declines (Bradstreet *et al.* 1977), habitat availability *per se* does not seem to be a factor currently limiting reproduction (Lambert and Nol 1978). Nevertheless, high water levels in

conjunction with the storms of Lake Erie are known to wash-out some nests. It is reasonable to assume that the combined effects from all the above factors have been responsible for the decline of the species at Long Point.

The Piping Plover's distribution on Long Point has changed in the last 20 years. Hussell and Montgomerie (1966) found that all pairs observed from 1960 to 1965 nested on the south beach within about 8 km of the eastern end of the Point. This area continued to be used from 1966 to 1975, although less so after 1972, when some birds moved to territories nearer to the base of the Point (Cartar 1976). All nests or attempted nestings since 1975 have been confined to the south beach between the Provincial Park and Squires Ridge. The birds prefer dry, light-coloured, sandy (often pebbled) beaches that are fairly wide, high, flat, and unvegetated, especially if a feeding area such as a beach pool or open marsh is nearby (Lambert and Nol 1978). The disappearance of beach pools and other changes in beach structure near the eastern end of the Point may be the reason why the birds have recently left that area. To what extent this shift in distribution has affected the Piping Plover's reproductive success is uncertain.

We are aware of about 70 reports of nests on Long Point, a few of which are noteworthy. On 20 May 1964, one nest contained eight eggs, twice the normal clutch (Hussell and Woodford 1965). Since then, three other nests containing unusually large clutches have been found; one contained five eggs on 23 May 1965 (T. Davis, ONRS), the second had six eggs on 2 June 1969 (M. Bradstreet, ONRS), and the third had seven eggs on 20 June 1970 (G. North, pers. commun.). This last nest was previously unreported. Mention should also be made of another nest previously unknown to us, west of Courtright Ridge; it contained four eggs on 10 June 1972 (A. Wormington, pers. commun.).

Egg laying begins in early to mid-May and replacement clutches are common if the first nest is unsuccessful.

Egg dates: 9 May – 29 July

*** Killdeer (*Charadrius vociferus*)**

Common and regular; formerly less common.

Snyder (1931) reported that although the Killdeer was common on the mainland, it was present only in small numbers on the Point. It is now common throughout the region and is probably even more common on the Point than on the mainland. The first breeding record was not secured until 18 May 1946, when a nest with four eggs was found (G. North, pers. commun.).

The Killdeer is primarily a beach-nesting species at Long Point, but it also nests on other flat sandy areas where vegetation is sparse. It rarely nests in the centre of clumps of vegetation, preferring open sandy or pebbled beach areas (E. Nol, pers. commun.). It can also frequently be found nesting on lawns, in gardens, and along gravel roads at the base of the Point. Territories have been reported from the intergrading dune-swale-savannah (15 territories/km²), recreational dune area, and dune grass – cottonwood beach census plots.

We are aware of over 140 nest records. Eggs are often laid as early as the last week of April at the base of the Point. Two broods are frequently raised in a season.

Egg dates: 14 April – 16 July

*** American Woodcock (*Philohela minor*)**

Fairly common and regular.

Snyder (1931) stated that the woodcock was less common on Long Point as a summer resident than it was in the early days. It is now fairly common in the woodlands and may even be common in some areas such as the Courtright Ridge and Gravelly Bay Road. It has been reported as a territorial species on only two census plots (red oak – sugar maple forest and the tamarack – white cedar slough), but its apparent absence from other plots may be partly due to its very early breeding season and nocturnal habits.

We are aware of 15 breeding records, beginning with three nests on Ryersons Island in 1927 (J.L. Baillie, ONRS). Nesting begins early in the season, usually in late April.

Egg dates: 10 April – 10 June

*** Common Snipe (*Capella gallinago*)**

Fairly common and regular; formerly more common.

Snyder (1931) reported that the snipe was no longer a common summer resident on Long Point. It is still a rather uncommon species except during migration. The only breeding record is of a nest containing four eggs on 1 May 1977 in a wet meadow at Long Point Beach (J. Bax, ONRS). Before that, an immature bird, believed to be locally reared, was collected on 12 July 1927 at Second Island (Snyder 1931). The paucity of breeding records suggests that the species is rare and occasional at Long Point. However, the fact that adults are regularly observed performing their characteristic nuptial flights leads us to suspect that nests are just very difficult to find. It was a territorial species on the wet grassy marsh and dense grassy marsh – shrub carr plots at the base of the Point.

*** Spotted Sandpiper (*Actitis macularia*)**

Common and regular.

Spotted Sandpipers are more common on the Point than they are on adjacent sections of the mainland. Although the species is widespread, densities are probably greatest within about 10 km of the eastern end of the Point. It has been reported as a territorial species from only one census plot, the dune grass – cottonwood beach. Nests are typically situated in the sandy dunes at the rear of the beach; beach habitat is seldom used for nesting except where there is adequate grass cover.

We are aware of over 50 breeding records, the first being of a nest on 31 May 1927 at Second Island (J.L. Baillie, ONRS). Nesting usually begins late in May and most nests have hatched young by the end of June.

Egg dates: 14 May – 17 July

*** Wilson's Phalarope (*Steganopus tricolor*)**

Very rare and casual.

This species breeds very locally in southern Ontario. Summer sightings at Long Point are few: one on 31 July 1967, one near Courtright Ridge on 3 August 1977 (LPBO), and one at the Port Rowan sewage lagoons on

on 15 June 1978 (A. Wormington, pers. commun.). There is a record of a nest being found near the Causeway sometime around 1960, but it is very poorly documented (R. Copeland and J. Miles, pers. commun.). A flightless brood was banded on 1 July 1981 by C. Lemieux (LPBO) near Courtright Ridge.

*** Herring Gull (*Larus argentatus*)**

Locally fairly common but casual.

The Herring Gull is much more common as a summer visitor to Long Point than as a nesting species. Snyder (1931) believed that Herring Gulls did not nest anywhere on Lake Erie and he recorded only small flocks of sub-adult birds at Long Point. All age groups now occur as summer visitors (Weseloh *et al.* 1975) and colonies now exist on Lake Erie (Blokpoel and McKeating 1978). The nearest colony is at Mohawk Island, Lake Erie (60 km northeast of Long Point); 226 nests were reported there in 1977 (Blokpoel and McKeating 1978) and 259 nests were counted there on 21 May 1980 (G. Tessier, CWS).

There are breeding records for 2 years on Long Point. The first was a nest containing two eggs on the south beach about 2 km from the eastern end on 3 June 1967 (G. Page, ONRS). This nest was in a small colony of Common Terns. In 1980, 15 pairs of Herring Gulls nested on the flats west of Courtright Ridge. For the 15 nests censused by CWS on 5 June, 6 contained one egg, 8 contained two eggs and 1 contained three eggs (G. Tessier, CWS). The site was checked a week later by LPBO but no nests were found and they were probably washed out.

*** Ring-billed Gull (*Larus delawarensis*)**

Locally common but casual.

In the past few decades, Ring-billed Gull populations have increased dramatically throughout the Great Lakes (Ludwig 1974). As many as 17 000 birds may summer at Long Point (Lambert and Nol 1978). The Point is probably one of the most attractive summering and pre-migratory staging areas on the lower Great Lakes (Weseloh *et al.* 1975).

Although the Ring-billed Gull is an abundant non-breeding summer visitor to Long Point, it is virtually absent as a nesting species. The first breeding record for Long Point was a nest containing two eggs on 4 June 1967 on the south beach, about 2 km from the end of the Point (G. Page, ONRS). On 15 May 1980, P. Verburg (LPBO) counted 75 nests along the south beach west of Courtright Ridge. Of these, 13 nests had three eggs, 8 contained two eggs, 8 contained one egg, and 46 nests were empty. It is believed that none were successful. Tessier (CWS) visited the site on 5 June and found 58 nest remnants but no shells or dead chicks. The nearest colony is at Mohawk Island, Lake Erie (60 km northeast of Long Point); 520 nests were reported there in 1977 (Blokpoel and McKeating 1978). CWS visited the site on 21 May 1980 and counted 792 nests (G. Tessier, CWS).

Little Gull (*Larus minutus*)

Locally uncommon and irregular; formerly absent.

The first recorded nesting of Little Gulls on the continent occurred at Oshawa, Ontario, in 1962 (Scott 1963). This species has been regularly recorded in the summer at Long Point since 1960 at least, when one was seen on 5 August about 8 km from the end of the Point (D. Hussell, LPBO). A few other records are as follows: 1 at the tip on 21 July 1968 (M. Bradstreet, LPBO), 1 in the vicinity of Courtright Ridge on 31 May 1973 (D. Hussell, LPBO), 11 in the same area on 14 July 1974 (A. Wormington, pers. commun.), 40 seen by R. Copeland and B. Eaton in the summer of 1976 (Goodwin 1976), 9 in the Courtright Ridge area on 19 June 1976 (A. Wormington, pers. commun.) and 10 on 3 August 1977 (LPBO). A. Wormington (pers. commun.) reports seeing 2 adults, 2 second-year birds and 5 hatching-year birds on 18 June 1975. The best indication of nesting was obtained by Wormington when he observed 9 adults, 19 immatures, and 9 young-of-the-year west of Courtright Ridge on 29 June 1975 (Goodwin 1975).



*** Forster's Tern (*Sterna forsteri*)**

Locally common and regular; formerly absent.

In Canada, this is typically a bird of the prairie regions but it also breeds very locally in extreme southern Ontario. It was first reported at Long Point on 15 July 1950 and the possibility of nesting was suggested at that time (Baillie 1950). On 6 July 1975, A. Wormington reported seeing 12 flying young-of-the-year (Goodwin 1975). Proof that this species was breeding at Long Point was first obtained on 6 June 1976 when a colony of about 50 pairs was found in a section of cattail marsh in what is now part of the Long Point National Wildlife Area (M. Field and LPBO, ONRS). Twelve of the 17 nests found contained eggs and the rest were empty. One young chick, not long out of the nest, was also found. A further nest was found containing one egg and one chick by A. Wormington (ONRS) on the same date. In 1978, 11 recently fledged juveniles were observed west of Courtright Ridge on 21 July (LPBO). Towards the end of May 1979, M. Field located 20 nests, containing eggs and young, in the CWS marsh near Thoroughfare Point. In 1980, the birds relocated to two areas well within the Long Point Company Marsh. About 60 adults were observed on 4 June but no census could be taken (G. McKeating, CWS).

* **Common Tern (*Sterna hirundo*)**

Locally common and irregular; formerly more common.

Common Terns have nested on Long Point at least since 1907, when W.E.C. Todd (MS) was told of a colony on the south beach west of Courtright Ridge. G. North informs us that, about 1924, there was an almost continuous line of nests along the beach where the cottages are now (Long Point Beach). Snyder (1931) was later informed of a colony near the eastern end of the Point; eggs were apparently distributed so thickly that it was difficult to walk through the colony without stepping on them. Sheppard (1935) reported a colony of 75–100 pairs somewhere near the base of the Point on 6 July 1933.

By the 1960s, colony sizes were much smaller than had been reported earlier. A colony of 10 nests was found near the eastern end of the Point on 11 June 1960 (G. Fairfield, LPBO) and 26 nests were reported in 1967 (LPBO, ONRS). This colony remained active fairly regularly until 1971, when only two nests were reported (D. Hussell, ONRS). The Common Tern apparently disappeared as a nesting species from Long Point after 1971, but returned in 1975 and nested on the flats west of Courtright Ridge; three pairs were believed to have nested and one nest was found (J. McCracken, ONRS). Eighteen and 15 nests were found there in 1977 and 1978 respectively (LPBO, ONRS). Frequent sightings of territorial adults indicated that the colony was probably still active in 1979. No nests were found in 1980.

It is obvious from the above discussion that the Long Point tern colonies have never been very stable. Nests are likely to be washed-out during Lake Erie storms and this has probably contributed to colony abandonment and poor nesting success in general. Large flocks of summering gulls on the beaches have probably also had a detrimental effect on the breeding of Common Terns. Blokpoel and McKeating (1978) have indicated that the Lake Erie tern population, in general, may be declining.

Egg laying begins about the middle of May, but replacement clutches are often laid if the first clutch is destroyed, and nests with eggs can often be found into July.

Egg dates: 12 May – 12 July

* **Black Tern (*Chlidonias niger*)**

Locally abundant and regular.

Black Terns have been common in the Long Point marshes since the earliest records. W.E.C. Todd (MS) found them common and noted several nests on 12 July 1907 (ONRS). Snyder (1931) also remarked on their abundance; in 1927 his party found at least 40 nests. More recently, E. Dunn (LPBO) conducted a 2-year study of the breeding biology of the species and reported 23 and 32 nests from one 14-ha study area in the Crown Marsh in 1975 and 1976, respectively (Dunn 1979).

The Black Tern is a semi-colonial nesting species, favouring certain areas of the main cattail marshes at Long Point. A limited number of nestings occur in the marshes of some of the sheltered bays towards the eastern end of the Point and in some of the interdunal ponds (LPBO). At the base of the Point, the Big Creek marshes also support small populations.

Ample water cover is a chief habitat requirement. Interspersed stands of cattail are preferred for nesting; dense unbroken stands are rarely occupied (Dunn 1979). Nests are usually placed on floating mats of vegetation or other debris in sheltered openings in the marsh. We are aware of over 130 nest records.

Egg dates: 15 May – 12 July

* **Mourning Dove (*Zenaidura macroura*)**

Very common and regular; formerly rare.

The Mourning Dove was formerly not a nesting inhabitant of the Point, being more common in adjacent sections of the mainland (Snyder 1931). During recent decades, however, there has been a general increase in the population in the Great Lakes region (Snyder 1957, de Vos 1964). Although it has become increasingly common and is now plentiful in

areas across the base of the Point (78 of the 88 nests found at Long Point were there) it is still uncommon east of the Provincial Park (where only 10 nests were found, most of them on Courtright Ridge). This distribution is also reflected in the results of the breeding-bird censuses. The Mourning Dove was one of the most common breeding species on the wet woodland plot (100 territorial males/km²) at the base of the Point, whereas no more than one territory has ever been reported for any of the plots farther east (recreational dune area, tamarack – white cedar slough, white pine – white cedar forest, and red oak – sugar maple forest).

Mourning Doves favour evergreen trees for nesting, but they can also be found in a wide variety of other situations in this region. For example, in the Hahn Woods nests are often in crotches of dead trees.

Nesting was first reported on 16 June 1940 at the base of the Point (J.L. Baillie, ONRS). A nest was later found at Courtright Ridge on 28 May 1964 (D. Baldwin, ONRS). In the following year, M. Field (ONRS) found 50 nests at Long Point Beach. G. Miller (ONRS) found a nest on 20 July 1974 about 4 km from the eastern end of the Point; none have yet been reported for locations farther east.

Nesting often begins in early April; eggs can sometimes be found well into August, and occasionally early September. Two nestings (occasionally three) are typically attempted in a season.

Egg dates: 9 April – 2 September

Passenger Pigeon (*Ectopistes migratorius*)
(Extinct).

The last sight record of the Passenger Pigeon in Ontario was made in 1902 (Snyder 1957). Mitchell (1935) has chronicled the history of the species in Ontario, and reports the only known nesting for Long Point. This refers to a nest found in 1845, but unfortunately no other details were given. Another breeding record was suggested by Snyder (1931), who noted that Wm. Pope painted a picture of a young bird (probably obtained locally) in late June 1860. Although Long

Point was possibly only a minor nesting area, immense flocks of the species passed through the district during its migrations in the early 19th century (Snyder 1931).

*** Yellow-billed Cuckoo (*Coccyzus americanus*)**

Very common and regular.

The relative status of the two cuckoo species on Long Point is not fully understood. The yellow-billed was formerly regarded as being less common than the black-billed (Snyder 1931), but its population seems to have increased in recent years. It is fairly evenly distributed on Long Point, frequenting open deciduous woodlands and thickets. It has been reported as a territorial species on the birch-oak savannah and wetland, tamarack - white cedar slough, red oak - sugar maple savannah, and wet woodland census plots.

Nests are difficult to find and there is only one report, a nest containing three young in a buttonbush on Courtright Ridge on 6 July 1927 (J. Edmonds, ONRS). There is also a record of an egg of this species being found in a Black-billed Cuckoo's nest on 24 June 1927 (J. Edmonds, ONRS).

*** Black-billed Cuckoo (*Coccyzus erythrophthalmus*)**

Uncommon and irregular.

Snyder (1931) found this species to be more common than the Yellow-billed Cuckoo, but this is no longer the case. No Black-billed Cuckoo territories have been reported for any of the census plots, but the species has been recorded as a visitor in the wet woodland and tamarack - white cedar slough.

Like the Yellow-billed Cuckoo, this species nests in open deciduous woodland and thickets on Long Point. There are only two nest records; one of a nest containing four eggs in a buttonbush on 24 June 1927 (J. Edmonds, ONRS), and another of an empty nest found on Courtright Ridge on 12 July 1927 (L.L. Snyder, MS). Young of the year were banded at the eastern end of the Point on 28 June 1964 and 10 July 1967 (LPBO). Nearby on the mainland, a nest containing one egg and two young was

reported at the Backus Conservation Area on 7 June 1975 (LPBO, ONRS).

Screech Owl (*Otus asio*)

Very rare and occasional.

Snyder's (1931) only record of this species on Long Point was of a bird heard on Courtright Ridge on 6 July 1927. Macoun (1898) reported it on the Point on 2 June 1898. The best evidence for nesting to date is a record of the banding of a female with a brood patch on 25 March 1970 on Courtright Ridge (LPBO). More recently, R. Copeland reports having found a dead Screech Owl on the road at Long Point Beach in the summer of 1975.

*** Great Horned Owl (*Bubo virginianus*)**

Fairly common and regular.

Snyder (1931) found this owl to be fairly common on Long Point, but recorded no nestings. There are now eight breeding records for the Point and four more for adjacent sections of the mainland. Although most of the Long Point nestings were in the Courtright Ridge area, the species is known to inhabit woodlands throughout the Point. Nests are often in old Bald Eagle nests.

Nesting begins early, usually in March or early April. Breeding records are as follows: 6 April 1963 - in an eagle nest on Courtright Ridge (G. Peck, LPBO).

14 March 1965 - adult on an eagle nest on Courtright Ridge (LPBO).

6 May 1977 - two young in an eagle nest on Courtright Ridge (P. Copestake, LPBO).

27 March 1978 - three young in a nest in a pine east of the Gravelly Bay Road (M. Bradstreet).

June 1978 - a juvenile not long out of the nest, in the Hahn Woods at the base of the Point (J. McCracken).

27 March 1979 - adult in an eagle nest on Courtright Ridge; at least one young on 22 May (G. Holroyd and P. Verburg, ONRS).

Spring 1979 - adult on nest on Squires Ridge (S. Flynn, CWS).

24 April 1980 - three young in nest on Courtright Ridge (LPBO).

*** Short-eared Owl (*Asio flammeus*)**

Very rare and casual.

Snyder (1931) reported that at least two pairs of Short-eared Owls were established in the marshes in the vicinity of Snow Island in the summer of 1927. A flightless young bird, collected on 15 June of that year, constitutes our only breeding record for the species. There has been no evidence to suggest that the species has nested since that date.

*** Saw-whet Owl (*Aegolius acadicus*)**

Very rare and occasional.

A juvenile specimen, not long out of the nest, was collected on 6 July 1927 on Courtright Ridge, and this record established that the Saw-whet Owl nests on Long Point. There are also a few other recent summer observations of juveniles. These were of birds banded or observed by LPBO at the eastern end of Long Point on 9 July 1965, 27 June 1966, 3 July 1972, and 11 July 1972.

*** Whip-poor-will (*Caprimulgus vociferus*)**

Fairly common and regular.

Snyder (1931) did not record the Whip-poor-will during his visits to Long Point and he reported that it was not very common on the mainland. Although it is now common in certain forested tracts of the adjacent mainland (A. Wormington reports having heard 19 calling in a pine forest at the St. Williams Forestry Station on 28 May 1972), it is still relatively uncommon on the Point. It has been found as a territorial species on only two census plots; the white pine - white cedar forest and birch-oak savannah and wetland. Whip-poor-wills probably prefer to nest in mixed or evergreen woods, especially where there is leaf litter. There are three nest records: 9 June 1974 - nest containing two eggs in the white pine - white cedar forest near the eastern end of the Point (G. Miller, ONRS). 3 June 1978 - nest with two eggs in the same area as the preceding record (LPBO). 4 June 1980 - nest with two eggs near Gravelly Bay contained two young on 28 June (P. Lepson, CWS).

***Chimney Swift (*Chaetura pelagica*)**

Uncommon and irregular.

This is another species which is more common on the mainland than on Long Point. Nests are usually in chimneys or inside old buildings. As such, the distribution of the species on Long Point is very much restricted by the availability of suitable nest sites, and it is probably most common in cottage areas.

There are only three records of nests:

4 July 1927 – nest in the chimney of a cabin on Courtright Ridge (Snyder 1931).

Summer 1960 – a nest at the eastern end of the Point (LPBO).

11 June 1966 – nest in a barn at the eastern end of the Point (G. Page, LPBO).

An adult was also seen entering a chimney of another building at the tip of the Point on 12 June 1966 (G. Page, LPBO).

***Belted Kingfisher (*Megasceryle alcyon*)**

Common and regular.

The sand banks on the south beach of the Point afford the most suitable locations for the nesting of this species. These banks are of limited occurrence on the leeward (north) side of the spit and only one nest has been reported from there (B. Ratcliff, ONRS). Although kingfisher burrows are frequently found, the contents of only three nests have been inspected:

29 June 1972 – nest with three young (B. Ratcliff, ONRS).

5 July 1975 – nest with two young (J. McCracken, LPBO).

12 August 1979 – nest with one young (LPBO, ONRS).

***Common Flicker (*Colaptes auratus*)**

Very common and regular.

Snyder (1931) found this species to be fairly common on Long Point. In 1927 his party collected five juvenile birds, including two from a nest on 26 June (J.L. Baillie, MS).

The flicker occurs in all wooded sections of the Point. On the eastern portions, nests are usually situated in birch or cottonwood trees. Densities were greatest on the birch-oak savannah and wetland plot (85 territorial males/km²). Territories were also

reported on the intergrading dune-swale-savannah, red oak – sugar maple savannah, red oak – basswood savannah, sedge-tamarack dune pond, tamarack – white cedar slough, white pine – white cedar forest, red oak – sugar maple forest, and wet woodland plots.

Although 17 nests have been reported, the contents of only a few have been examined. Eggs are probably laid by the end of May and most nests have fledged young by mid-July. Nests with eggs are as follows:

26 May 1967 – nest containing two eggs at the Provincial Park (W. Fox, ONRS).

1 June 1967 – nest containing three eggs at the Provincial Park (W. Fox, ONRS).

17 June 1967 – nest containing two eggs at the eastern end of the Point (M. Bradstreet, ONRS).

***Red-headed Woodpecker (*Melanerpes erythrocephalus*)**

Common and regular.

Snyder (1931) found the Red-headed Woodpecker to be "fairly common". Populations apparently declined for a period after that. In 1936, M. Landon (MS) reported that this species was becoming scarce in the region. Similarly, in his notes of 1956, A.W. Preston reported that it was formerly a moderately common summer resident in the Port Dover area, but had become "quite rare in recent years". By the 1970s, however, local populations had begun to recover and are probably still on the increase. It has been reported as a territorial species on three census plots: red oak – sugar maple savannah, birch-oak savannah and wetland, and wet woodland.

There are seven records of nests. The first two were reported by Snyder's party in 1927; one of them contained four eggs on 29 June (J.L. Baillie, ONRS). Other nests are:

14 June 1974 – nest containing young at Long Point Beach (J. Evans, ONRS).

29 June 1978 – nest containing young in the birch-oak savannah and wetland census plot (R. Hurst, ONRS).

20 May 1979 – nest in the wet woodland contained young on 4 July (J. McCracken, ONRS).



25 June 1979 – nest containing young on Squires Ridge (P. Verburg, ONRS).

27 June 1979 – nest containing young on Squires Ridge (P. Verburg, ONRS).

***Hairy Woodpecker (*Picoides villosus*)**

Fairly common and regular.

Snyder (1931) noted Hairy Woodpeckers regularly on Long Point in 1927, and eight juveniles were collected by his party. There are only three nest records; the first is a nest with young on 11 June 1975 in a birch just west of the Gravelly Bay Road (J. McCracken, ONRS). Adults carrying food were noted in the same vicinity in the summer of 1978, but a nest could not be found. A nest containing young was found in the Hahn Woods on 13 June 1979 (J. McCracken, ONRS). In 1980, adults were seen delivering food at a nest on Little Creek Ridge during June (LPBO). The Hairy Woodpecker has been recorded as a territorial species on only two census plots; the white pine – white cedar forest and the birch-oak savannah and wetland.

***Downy Woodpecker (*Picoides pubescens*)**
Common and regular; formerly more common.

Snyder (1931) reported that this species was two or three times as common as the Hairy Woodpecker on Long Point. His party collected 15 juveniles during the summer of 1927 and one nest was found in a birch on Squires Ridge on 25 June. The only nest reported since then was in the Hahn Woods on 6 June 1979 (J. McCracken, ONRS). Territories were reported from three census areas (wet woodland, birch-oak savannah and wetland, red oak - sugar maple forest).

***Eastern Kingbird (*Tyrannus tyrannus*)**
Very common to abundant and regular.

Snyder (1931) found kingbirds to be only "fairly common" during his visits to Long Point. Whether or not populations have actually increased since that time, however, is not certain. Snyder's report was based primarily on observations made from Courtright and Squires ridges where the species is indeed not very common. In more open areas of Long Point, however, kingbirds nest very commonly.

Fairfield (1969) found that the kingbird was the most common breeding species within 2 km of the eastern end of the Point. It is one of the most widely distributed species on Long Point; territories have been reported from all census plots except some of those in marsh habitat. The greatest densities were reported from the following study areas: tamarack - white cedar slough (66 territorial males/km²), birch-oak savannah and wetland (60/km²), red oak - basswood savannah (53/km²), red oak - sugar maple savannah (47/km²) and intergrading dune-swale-savannah (41/km²).

The kingbird nests in a wide variety of situations, typically in cottonwoods in the drier areas or in tamaracks and buttonbushes in the wetter zones. There are nearly 100 nest records. Many of these were obtained through special studies recently conducted on the species at the end of the Point. These studies showed that some birds return to the same

territories and even the same nest sites (Fairfield 1974, 1976).

Egg dates: 1 June - 20 July.

***Great Crested Flycatcher (*Myiarchus crinitus*)**

Very common to abundant and regular.

This species is noted regularly in most of the mature woodlands at Long Point. Densities were greatest on the birch-oak savannah and wetland (68 territories/km²) and red oak - sugar maple savannah (67/km²) census plots. Territories have also been reported from the red oak - sugar maple forest, red oak - basswood savannah, wet woodland, tamarack - white cedar slough, and white pine - white cedar forest.

Nests are difficult to locate and breeding records are few. The first evidence for breeding was reported on 21 July 1927 when an immature bird was observed on Courtright Ridge (J.L. Baillie, MS). Since then, only three nests have been reported:

20 June 1974 - nest containing five eggs near the Old Gravelly Bay Road (G. Holroyd, ONRS).

13 June 1978 - adults at a nest in the Hahn Woods (J. McCracken, ONRS).

13 June 1980 - two adults seen entering a nest on Little Creek Ridge (LPBO).

***Eastern Phoebe (*Sayornis phoebe*)**

Rare and irregular.

Snyder's (1931) observation that phoebes were rare on the Point but fairly common on the mainland still applies. There are comparatively few suitable nesting locations for this species on Long Point and it has not been recorded as a territorial species on any of the census areas. Nests are typically placed on buildings or other man-made structures.

There are only three nest records:

11 July 1927 - empty nest in an old building on Courtright Ridge (L.L. Snyder, ONRS).

11 June 1967 - nest with three eggs in an old car near the eastern end of the Point (M. Bradstreet, ONRS).

21 July 1977 - nest with four young on a

cabin at the end of the Point (C. Risley, LPBO).

Willow Flycatcher (*Empidonax traillii*)

Locally common and regular.

Snyder (1931) did not record the Willow Flycatcher at Long Point but may have overlooked it. It occurs in wet willow and alder thickets at the base of the Point. A few pairs maintained territories in the Hahn Marsh in 1978, 1979, and 1980. One pair was also found at the Provincial Park in 1980 and an empty nest was found (J. McCracken). So far, there is no indication that it nests farther east than the Provincial Park.

***Eastern Wood Pewee (*Contopus virens*)**
Abundant and regular.

The status of the pewee has not changed since Snyder (1931) remarked that it was one of the most common summer residents on Long Point. It is most abundant in the more mature deciduous woodlands. Densities were greatest on the red oak - sugar maple savannah (233 territories/km²), birch-oak savannah and wetland (197/km²), red oak - basswood savannah (113/km²), and red oak - sugar maple forest (87/km²) census plots. Pewees also held territories on the white pine - white cedar forest, tamarack - white cedar slough, and wet woodland plots.

Nests are difficult to find and there are only seven reports:

21 June 1927 - empty nest on Squires Ridge (J. Edmonds, ONRS).

29 June 1973 - nest with three eggs on the tamarack - white cedar slough census plot near the eastern end of the Point (W. Joyce, LPBO).

June 1975 - two nests being incubated, both in birch, in the same area as the preceding record (J. McCracken, ONRS).

June 1980 - two nests being incubated on Little Creek Ridge (LPBO) and one on Squires Ridge (J. McCracken, CWS).

***Horned Lark (*Eremophila alpestris*)**

Rare and occasional.

This species usually occurs only at the base of the Point. There are extremely few

records of it farther east than the Provincial Park. A juvenile was captured on the beach towards the tip, however, on 8 August 1967 (G. Page, LPBO). The Horned Lark is typically a bird of roadsides and fields, and therefore is much more common on the adjacent mainland. There is only one nest record for Long Point; a nest with five eggs on 15 June 1967 at the Provincial Park (W. Fox, ONRS).

***Tree Swallow (*Iridoprocne bicolor*)**

Abundant and regular.

Snyder (1931) remarked that "numbers" of Tree Swallows remained on Long Point to breed and that they were well distributed throughout the area. It is unclear what was meant by "numbers", but as only two nests were found in 1927 (J.L. Baillie, MS), it seems likely that this species was formerly not quite as common on the Point as it is today. It is now one of the most common breeding species in some habitats. Densities were greatest on the following census plots: birch-oak savannah and wetland (299 territories/km²), wet woodland (208/km²), red oak - sugar maple savannah (146/km²), and red oak - basswood savannah (133/km²). Other plots containing territories were: sedge-tamarack dune pond, bluegrass-milkweed grassland, recreational dune area, dry juniper-cottonwood savannah, intergrading dune-swale-savannah, tamarack - white cedar slough, and red oak - sugar maple forest. Breeding densities are probably governed by the availability of suitable cavity nest-sites; Holroyd (1975) concluded that this was the critical factor limiting the number of breeding pairs of Tree Swallows at the eastern end of Long Point.

This species has been the subject of many years of research by the LPBO. A few Tree Swallow nestboxes were erected near the end of the Point in 1963. Since then, many more boxes have been placed there, as well as on Courtright Ridge, at the Lee Brown Marsh, and on the adjacent mainland at the Port Rowan sewage lagoons and in the Backus Conservation Area. Most attention has focused on the nestbox colony near the eastern end of



the Point, in semi-flooded dune-grass habitat. This colony currently consists of about 100 boxes, although there were 170 boxes in the early 1970s.

We know of some 1300 nestings on Long Point, about 95 of them in naturally occurring cavities. Studies have shown that many birds return to breed at Long Point in successive summers (Bradstreet 1969a, Hussell 1974b, De Steven 1978).

The peak laying period is usually in the last 2 weeks of May. Median dates for the laying of the first egg in a clutch ranged from 21 to 29 May during a 9-year period (Hussell 1974a, 1974b; De Steven and Hussell 1977). The egg-laying period is as much as a week later at the end of the Point than on the mainland, presumably because of the lower temperatures at the tip (Lambert 1979; D. Hussell, pers. commun.). The Tree Swallow is single-brooded but replacement nestings sometimes occur if clutches are unsuccessful early in the season.

Egg dates: 14 May - 13 July



***Bank Swallow (*Riparia riparia*)**

Locally abundant and regular.

Bank Swallows nest in colonies in the sand banks along the beaches of Long Point. The colonies fluctuate considerably in size and location, depending on shoreline erosion. The largest colony on the Point, located about 10 km from the tip, contained about 100 nests on 15 June 1969 (G. Holroyd, LPBO). The total nesting population of Bank Swallows on the Point that year was estimated as about 500 pairs; high water had caused erosion of the dunes on the south beach, thus providing many good nesting sites (Bradstreet 1969b). All other colonies reported contained fewer than 50 nests.

The contents of only 13 nests have been examined. Egg laying probably begins in the first week of June, but nests with eggs have been found as late as 20 July.

***Barn Swallow (*Hirundo rustica*)**

Locally abundant and regular.

The Barn Swallow is a common nesting species only where buildings and other

structures offer suitable nest sites. Elsewhere on Long Point it only occurs as a visitor.

We are aware of over 300 nest records for this species. Egg laying does not usually begin until late May. Two broods are frequently raised in a season and renesting often takes place in the original nest.

Egg dates: 16 May – 4 August

***Cliff Swallow (*Petrochelidon pyrrhonota*)**

Locally uncommon to common and occasional.

W.E.C. Todd (MS) noted several Cliff Swallows around Port Rowan in July 1907 and observed an adult bird feeding a young one east of the town on 13 July. Snyder (1931), however, did not record the species in the region during 1927 and 1928.

Cliff Swallows have nested on Long Point in recent years, but populations fluctuate considerably, and the species does not nest every year. Two nests, reported in July 1965 at the eastern end of the Point (T. Davis, ONRS), were the first breeding records. A nest containing three eggs was also found there on 5 July 1972 (G. Holroyd, ONRS). The species nests commonly on the adjacent mainland, particularly at the Port Rowan dock and under bridges up Big Creek.

Egg laying begins the last week of May and young have been noted in the nest as late as 16 August.

Egg dates: 21 May – 20 July

***Purple Martin (*Progne subis*)**

Locally very common and regular; formerly less common.

The distribution and population size of this species on Long Point is limited by the distribution and numbers of suitable bird boxes (Holroyd 1975). Snyder (1931) reported that martins probably nested only at "the cottages", where nestboxes had been provided. Since then, many martin houses have been erected in the region, undoubtedly increasing the martin population. G. Bennett informs us that he found martins nesting in natural cavities in the Hahn Woods in the early 1950s. M. Bradstreet also recalls a nest being found in a dead tree at the lighthouse in

the late 1960s. Over 200 nests have been reported; most records were submitted by the LPBO for nests near the tip.

Egg dates: 3 June – 18 July

Blue Jay (*Cyanocitta cristata*)

Common and regular.

Snyder (1931) reported that the Blue Jay was rare on Long Point, but more numerous on the mainland. It is still less common on the Point, but frequents evergreen and mixed woods in the nesting season. It has been reported from three census plots: tamarack – white cedar slough, white pine – white cedar forest, and red oak – sugar maple forest.

Although there are no reports of breeding on the Point, a nest with eggs was reported by M. Porter (ONRS) on 10 May 1955 on the mainland at Backus Woods. G. North (pers. commun.) reports a nest on 17 May 1947 at Turkey Point.

***Common Crow (*Corvus brachyrhynchos*)**

Fairly common and regular.

The crow is widely distributed on Long Point, but it is probably most common in evergreen and mixed woods. In the interdune areas, it can often be found nesting in juniper scrubland. It has been reported as a territorial species on only one census plot, intergrading dune-swale-savannah. It is probable, however, that crows have been missed from many of the censuses because of their early breeding season, together with the difficulties involved in mapping the large and poorly defined territories that are probably characteristic of the species.

We are aware of nine nest records for the Point, the first being a nest with four young on Squires Ridge on 27 June 1927 (L.L. Snyder, ONRS). Eggs are often laid as early as mid April. Some of the more recent reports are as follows:

15 June 1966 – nest containing young near the eastern end of the Point; still contained young on 11 July (G. Page, ONRS).

12 April 1968 – nest containing six eggs in a red cedar near the end of the Point; contained young on 21 May (B. Whittam, ONRS).

2 May 1974 – nest containing four eggs

in a red cedar near the end of the Point (G. Holroyd, ONRS).

20 May 1976 – nest containing four young in a red cedar near the end of the Point (J. McCracken, LPBO).

Egg dates: 7 April – 10 June

***Black-capped Chickadee (*Parus atricapillus*)**

Very common and regular.

The chickadee occurs in evergreen and mixed woods at Long Point. It has been reported as a territorial species on the tamarack – white cedar slough and white pine – white cedar forest census plots.

Snyder (1931) collected a juvenile on 16 July 1927. An adult carrying food to young was collected on Courtright Ridge on 12 June 1927 (J.L. Baillie, MS). In 1980, a nest that contained five young on 6 June was found in the Hahn Woods (J. McCracken, CWS).

There are two records of nesting at Turkey Point on the mainland; one on 24 May 1927 (J.L. Baillie, ONRS) and another on 24 April 1938 (G. North, pers. commun.).

***White-breasted Nuthatch (*Sitta carolinensis*)**

Rare and irregular; formerly more common.

Snyder (1931) reported that "quite a number" of nuthatches nested on Long Point and that the species was equally common on the mainland. However, no territories were reported on the census plots and the present breeding status of the species on the Point is uncertain. It is probably more common in the deciduous woodlands of the mainland; Nol et al. (1978) reported it in the Backus Woods (8 km north of Port Rowan). Although no nestings have been reported for the Point, a juvenile was collected on 24 June 1927 (Snyder 1931). On the following day, J.L. Baillie (MS) noted a family group on Squires Ridge.

***House Wren (*Troglodytes aedon*)**

Abundant and regular.

The House Wren is one of the most common and widespread summer residents of

Long Point. It occurs in most woodlands, as well as in residential areas. It was most abundant on the following census plots: white pine – white cedar forest (175 territories/km²), red oak – sugar maple forest (160/km²), birch–oak savannah and wetland (103/km²), tamarack – white cedar slough (99/km²), red oak – sugar maple savannah (67/km²), and red oak – basswood savannah (67/km²). Territories have also been reported from the wet woodland and intergrading dune–swale–savannah study areas.

There are 18 records of active nests for Long Point, and an equal number for the adjacent mainland. Egg laying usually begins in June and more than one brood is often raised in a season.

Egg dates: 31 May – 3 August

***Carolina Wren (*Thryothorus ludovicianus*)**

Locally fairly common and irregular.

Nesting of this species in Canada is confined to extreme southern Ontario but it has recently been expanding its breeding range northward (de Vos 1964). It seems to be more common on Long Point than it is on the adjacent mainland.

Snyder (1931) reported a singing male on Courtright Ridge on 12 June and 26 July 1927. An egg shell found on the ground at Courtright Ridge on 4 July was believed to have belonged to this species (J.L. Baillie, MS). M. Landon (MS) reported that a pair of Carolina Wrens spent the summer on Long Point in 1936 and J. McNally (MS) heard one singing regularly in 1938. Mr. McNally informs us that, on 6 April 1939, he found a pair of birds at the Big Creek Muskrat Farm (now the headquarters of the Big Creek National Wildlife Area), and on 13 May he found a nest in a wash basin on the wall of one of the buildings. This was apparently the third known nesting in Ontario. We have no other nest records for the region, but G. North informs us that he observed two juveniles on 29 June 1963 at Turkey Point. A hatching-year bird was banded at the eastern end of the Point on 25 July 1977 (C. Henson, LPBO).

All recent summer sightings have been

reported from locations within about 5 km of the tip of the Point, particularly in the vicinity of the Gravelly Bay Road. A male was found singing in a tamarack swamp on 19 May 1962 (J. Miles, LPBO) and a few were noted on 15 July of that year (R. Stamp, LPBO). One was banded at the end of the Point on 17 June 1967 and one was seen there on 9 July 1970 (LPBO). An adult was observed within 2 km of the tip on 2 and 5 July 1972 (LPBO). In 1973, the species was recorded as a regular visitor to the tamarack – white cedar slough census area and a territory was reported for this plot in 1974. The Carolina Wren was a regular visitor to the white pine – white cedar forest census plot in 1975; two males were found singing there on 2 July (J. McCracken, LPBO).

***Long-billed Marsh Wren (*Cistothorus palustris*)**

Abundant and regular.

This species is one of the most abundant summer residents of Long Point. W.E.C. Todd (MS) found it to be very common in July 1907, and Snyder (1931) reported that it was common in favoured sections of the marshes.

Long-bills are fairly widespread, nesting from the Hahn Marsh to as far east as Gravelly Bay; however, they are seldom found in the interdune marshes. They prefer good water cover and generally avoid the drier marshes. Of 72 nests for which habitat was described, 71% were in cattail, 22% in grasses and sedges, and 7% in reeds.

On the marsh census study areas, Long-billed Marsh Wrens were most abundant in the wet grassy marsh, where densities ranged from 150 to 330 territorial males/km². Studies by OMNR in the Crown Marsh in 1977 showed that the species is very common there; 22 active nests were found (OMNR, unpubl. data). The species is equally abundant in the Long Point Company Marsh; marsh wrens were reportedly "singing everywhere" when a canoe trip was made through these marshes on 30 June 1968 (M. Bradstreet, LPBO).

There are 88 records for active nests



on Long Point. Most nests do not contain eggs until the first week of June; a second clutch in July is not uncommon.

Egg dates: 17 May – 27 July

***Short-billed Marsh Wren (*Cistothorus platensis*)**

Formerly locally common; now rare and occasional and probably declining.

Whereas the Long-billed Marsh Wren favours wet cattail marshes, the short-bill prefers grass or sedge marshes and damp meadows. Snyder (1931) encountered the species frequently in the wet grassy area between Squires and Courtright ridges in 1927. As many as 10 individuals were noted on a single day in that area. A juvenile was collected on 26 July 1927 and an empty nest was found (J.L. Baillie, MS). There are no subsequent reports from that area, but the species has been reported in marshes at the base of the Point. Three singing males were reported in the Crown Marsh on 20 May 1963

(LPBO). Mr. G. North informs us that there was once a thriving colony in the grassy marshes north of the Provincial Park as well as a colony at Turkey Point. Short-billed Marsh Wrens used to be much more common in southern Ontario, but they seem to have largely disappeared. We are aware of only three recent sightings at Long Point; one singing near the eastern end of the Point on 11 July 1970 (A. Wormington, pers. commun.), one in the same area on 7 June 1971 (J. Johnson, LPBO), and an adult by a nest in the Big Creek Marsh Unit in the summer of 1975 (G. McCullough, CWS). The only record of an active nest is that of W.E.C. Todd (MS), who found one containing four white eggs on 10 July 1907 in the marshes at the base of the Point. It is probable that populations of this species are adversely affected by high water levels, which reduce suitable habitat.

*** Mockingbird (*Mimus polyglottus*)**

Rare and irregular; formerly absent.

The Mockingbird's breeding range has expanded northward into Canada in recent years (de Vos 1964). It was first reported in the region by M. Landon (MS) who found it nesting at Nanticoke sometime before 1936. It was first reported at Long Point on 12 May 1957 (Speirs 1957), but breeding was not documented until 1966.

Mockingbirds seem to favour the eastern end of the Point; three nests have been reported within about 2 km of the tip. The only census area on which the species has been found was the intergrading dune-swale-savannah plot, where it occurred from 1965 to 1969 (Bradstreet and Page 1969, Fairfield 1969).

There are three nest records:

6 June 1966 – nest containing one egg; four eggs present on 16 June; hatched on 22 June (G. Page, ONRS).

27 June 1967 – empty nest; contained three eggs on 30 June (J. Bradshaw, ONRS).

8 June 1972 – nest containing one egg; five eggs present on 23 June; hatched on 25 June (E. Holroyd, ONRS).

*** Gray Catbird (*Dumetella carolinensis*)**

Very common and regular.

Snyder (1931) noted that few catbirds nested on Long Point because of the lack of undergrowth. The species can still be found more commonly in areas at the base of the Point and on the adjacent mainland where thickets and shrubbery occur. The only census area on which catbirds were common was the birch-oak savannah and wetland plot (60 territorial males/km²). Territories have also been reported for the white pine – white cedar forest, tamarack – white cedar slough, and wet woodland.

There are seven reports of nests for the Point. The first nest contained three young on 14 June 1927 on Ryersons Island (Snyder 1931). Other reports are as follows:

2 July 1965 – nest containing two young at Long Point Beach (M. Field, ONRS)

14 May 1977 – two nests, both containing young, at the base of the Point (C. Risley, LPBO).

1 July 1978 – a nest about 10 km from the eastern end of the Point in the birch-oak savannah and wetland census area (Hurst *et al.* 1979a).

17–18 June 1980 – two nests, both containing eggs, in a spruce plantation on Squires Ridge (J. McCracken, CWS).

*** Brown Thrasher (*Toxostoma rufum*)**

Common and regular; formerly less common.

Snyder (1931) found it surprising that there were no summer records for this species in the region. In his notes of 1956, A.W. Preston reported that it was a comparatively rare bird in the Port Dover area. Populations have apparently increased, however, and thrashers can now be found in areas of dense thickets and shrubbery, which are more common at the base of the Point than to the east. Territories have been reported from the recreational dune area, intergrading dune-swale-savannah, dry juniper-cottonwood savannah, and tamarack – white cedar slough census plots.

There are records of five nests, three of them on the ground:

19 June 1965 – nest containing three eggs near the eastern end of the Point; contained young birds on 23 June (T. Davis, ONRS).

3 July 1965 – nest containing three young in a pine at Long Point Beach (M. Field, ONRS).

16 June 1967 – nest containing one egg near the eastern end of the Point; contained three eggs on 20 June (M. Bradstreet, ONRS).

21 June 1969 – nest containing four eggs near the end of the Point (M. Bradstreet, ONRS).

1 June 1974 – nest containing four young in some vines east of the Provincial Park (B. Crins, ONRS).

Egg dates: 21 May – 29 June

*** American Robin (*Turdus migratorius*)**

Very common and regular.

Robins are far more numerous at the base of the Point and on the mainland than they are in outlying areas of the Point. A similar distributional pattern was noted by Snyder (1931). The only census areas on which the species held territories were the recreational dune area, red oak – sugar maple forest, tamarack – white cedar slough, and wet woodland.

There are 20 nest records for Long Point, most of them for locations west of Squires Ridge. Egg laying begins in April and two broods (rarely three) can be raised in a season. Young birds have been found in the nest as late as 10 August.

Egg dates: 17 April – 15 July

*** Eastern Bluebird (*Sialia sialis*)**

Rare and irregular; sometimes more common and frequent.

Macoun (1898) reported this species at Long Point on 21 June 1898, and W.E.C. Todd (MS) found it rather common in July 1907. Snyder (1931) reported the bluebird as a rather scarce summer resident. Its numbers fluctuate considerably, however, and in the 1960s and early 1970s it nested frequently in bird boxes near the eastern end of the Point. Twenty nests were reported between 1965 and 1972 (LPBO, ONRS). No nests have been reported since, however, and the species is once again quite rare. Reports of singing

males on 7 June 1973, 25 June 1975, and 6 June 1978 (LPBO) suggest that the bluebird still nests on Long Point, particularly in burnt-over areas. The only census plot reported to contain territorial birds was the intergrading dune-swale-savannah.

Egg dates: 28 May – 20 July

***Blue-gray Gnatcatcher (*Poliophtila caerulea*)**

Locally common and regular; formerly absent.

In Canada, the gnatcatcher breeds only in southwestern Ontario. Snyder (1931) had no records of it in the Long Point region, but its population has apparently increased in recent years. It is still of very limited distribution, however, and was found on only two census areas; wet woodland and birch-oak savannah and wetland. Canopies of damp (often wet) mature, open deciduous woodlands are apparently favoured by gnatcatchers in the Long Point region.

G. North has frequently found gnatcatcher nests at Turkey Point and he recorded the first nesting for Long Point on 14 May 1949. No other nests were reported until 1975 when one was found under construction on Courtright Ridge on 19 May (H. Howkins, LPBO). In 1978 and 1979, a breeding pair was seen frequently in the birch-oak savannah and wetland census plot about 10 km from the eastern end of the Point, a second pair was found near the Gravelly Bay Road, and three more pairs maintained territories in the Hahn Woods at the base of the Point. In the latter area, a nest was found under construction on 20 May 1979 and the female was seen on the nest on 13 June (J. McCracken, ONRS). An incubating bird was seen on Little Creek Ridge on 19 and 23 June 1980 (LPBO).

***Cedar Waxwing (*Bombicilla cedrorum*)**
Common and regular.

The Cedar Waxwing is a late-nesting species and so may have been overlooked on some of the breeding-bird censuses. Territories have been reported from only three census plots: wet woodland, red oak – basswood savannah, and tamarack – white cedar

slough. The Cedar Waxwing prefers open shrubby areas for nesting, and the species is probably more common on the adjacent mainland where there is a greater availability of such habitat.

There are only three nest records for Long Point. This paucity of records again may be due to the late nesting habits of the species. Eggs are not usually laid until the middle of June or later.

3 July 1965 – nest containing five eggs at Long Point Beach. (LPBO, ONRS).

26 June 1974 – empty nest in the tamarack – white cedar slough census area; later contained five eggs that hatched on 14 July (G. Miller, ONRS).

4 July 1979 – nest observed under construction in the Hahn Woods (J. McCracken, ONRS).

***Starling (*Sturnus vulgaris*)**

Abundant and regular (introduced).

The Starling was introduced at New York City in 1890 and then rapidly began to spread over most of the United States and southern Canada. Starlings evidently invaded the Long Point region in the early 1920s. Mr. A.W. Preston (MS) noted them for the first time at Port Dover on 11 March 1923. He also reported the first nest for the region later that same year. On Long Point, Snyder (1931) reported seeing flocks of Starlings in 1927 and secured a juvenile on 30 May. According to Snyder (1957), the Starling had become one of the most numerous birds in southern Ontario by about 1930.

The species is now widespread and common on Long Point, nesting wherever there are suitable bird boxes, natural cavities, or crevices in buildings. It is most common towards the base of the Point and on the mainland where such nesting opportunities are most plentiful. On census plots, it was most abundant in the red oak – basswood savannah (133 territorial males/km²), wet woodland (92/km²), red oak – sugar maple savannah (67/km²), and intergrading dune-swale-savannah (31/km²). Territories were also reported for the recreational dune area, dry juniper-cottonwood savannah, sedge-

tamarack dune pond, tamarack – white cedar slough, birch-oak savannah and wetland, and dense grassy marsh – shrub carr census plots.

We are aware of over 50 nest records for Long Point. Nesting often begins quite early; a nest was found under construction in a mailbox at Port Rowan on 31 March 1973 (G. Bennett, ONRS).

Egg dates: 8 May – 18 June

***Red-eyed Vireo (*Vireo olivaceus*)**

Very common and regular; probably formerly even more common and widespread.

This species is restricted to the mature deciduous woodlands of Long Point, particularly where some understory is present. It is much less widespread on the Point than it is on the adjacent mainland. Territories have been reported from only three census plots: red oak – sugar maple forest (58 territorial males/km²), birch-oak savannah and wetland, and wet woodland.

The Red-eyed Vireo seems to be less common on the Point than it was formerly, possibly because of a reduction in the amount of understory. Snyder (1931) indicated that it was one of the most common summer residents in the region. He found five nests in 1927; two nests each on Squires and Courtright ridges, and one on Ryersons Island. Only two nestings have been reported since then: 28 June 1978 – nest with young in the Hahn Woods (J. McCracken, ONRS).

1 July 1978 – nest containing two eggs in the birch-oak savannah and wetland census area about 10 km from the eastern end of the Point (R. Hurst, ONRS).

***Warbling Vireo (*Vireo gilvus*)**

Common and regular.

This species occupies habitat similar to that of the Red-eyed Vireo. Although quite common on the mainland and at the base of the Point, the Warbling Vireo is relatively scarce farther east. Snyder (1931) did not record it on the Point during the summer of 1927. W.E.C. Todd (MS), however, found it common near Port Rowan in July 1907, and A.W. Preston (MS) notes it as a fairly common summer resident in the Port Dover

area. It has been found as a territorial species on only two census areas: wet woodland and red oak – sugar maple savannah.

There are only two nest records for Long Point:

4 July 1979 – nest containing young in a silver maple in the Hahn Woods (J. McCracken, ONRS).

1 June 1980 – adult on a nest in a sugar maple at Squires Ridge (P. Tucker, CWS).

*Prothonotary Warbler (*Protonotaria citrea*)

Locally very common and regular; formerly absent.

The Prothonotary Warbler occurs only in flooded or swampy deciduous woodlands where there are sufficient dead trees in which to nest. Its range has expanded into Canada during this century and it was first reported as nesting at Rondeau in 1929 (Snyder 1957). It is still of very limited occurrence in Canada, nesting mainly along the north shore of Lake Erie (Point Pelee, Wheatley, Rondeau, Long Point, Turkey Point, and Point Abino).

G. North recorded this species for the first time in the Long Point region, on 28 June 1936, along Big Creek north of Port Royal. He found a nest in a fence post there in 1939, and another nest later on 29 June 1963. One nest was found there in 1980 (J. McCracken, ONRS). G. North has also found prothonotaries in the Backus Woods, in a wet woods area a few kilometres west of Big Creek, and in Port Rowan (nest in bird box). Until recently there was also a small population at Turkey Point.

The largest population of this species in the Long Point region occurs in the Hahn Woods. Prothonotaries were believed to be nesting there in 1938 (J. McNally, MS) and a nest with five eggs was found on 4 June 1944 (G. North, pers. commun.). Special studies of the Hahn Woods population were recently conducted by J. McCracken for CWS; six nests were found in 1978, eight in 1979 and six in 1980. This location is now believed to be one of the most important nesting areas for Prothonotary Warblers in Canada.

The localized habitat of these warblers



has resulted in a clumped distribution of the species in Ontario, making them highly susceptible to local extinction if the pockets of suitable habitat are altered or destroyed. This nearly happened to the Rondeau population when dead trees were cut down as part of a make-work program during the 1930s (Baillie 1967). That program reduced the Prothonotary Warbler population in the area from about 100 pairs (Baillie 1967) to an estimated size of 15–20 pairs by 1978 (A. Woodliffe, OMNR). A similar occurrence recently affected a small population at Turkey Point. Two pairs were known to inhabit a woodland there as recently as 1978 and nesting had been known since 1958 at least (G. Peck, ONRS). In 1979, however, most of the trees were removed and the species was extirpated. The continued survival of the Prothonotary Warbler in Canada is regarded as potentially precarious (Godfrey 1970, Goodwin 1977a).

Egg dates: 25 May – 4 July

Northern Parula Warbler (*Parula americana*)

Very rare and casual.

Snyder (1931) reported that this warbler was established as a rare summer resident

on Long Point. One was heard on Squires Ridge on 29 June 1927 (J.L. Baillie, MS) and two singing males were later collected on 8 July (Snyder 1931). We are aware of no other summer records and although Godfrey (1966) reports it as breeding on Long Point, this may refer to Snyder's (1931) records.

*Yellow Warbler (*Dendroica petechia*)

Abundant and regular.

The Yellow Warbler is common only where deciduous thickets and shrubbery occur. Yellow Warblers were most common on three census areas: red oak – sugar maple savannah (120 territorial pairs/km²), birch – oak savannah and wetland (94/km²), and the tamarack – white cedar slough (99/km²). Territories were also reported on the sedge-tamarack dune pond and red oak – basswood savannah plots.

Snyder (1931) found conditions particularly favourable for the nesting of this species on Ryersons Island; seven nests were found there in 1927. Other reports of nests are as follows:

Summer 1973 – nest with five eggs in the tamarack – white cedar slough (Nakashima 1973b).

26 June 1974 – nest in a grape vine at the edge of the tamarack – white cedar slough (G. Miller, ONRS).

21 June 1975 – nest containing young, also in a grape vine in the same locality (J. McCracken, ONRS).

6 June 1975 – nest containing five eggs in a white cedar in the birch-oak savannah and wetland (R. Hurst, ONRS).

June 1980 – nine nests found in a buttonbush swamp near Cedar Creek; one nest found east of Squires Ridge was also in buttonbush (M. Young, J. McCracken, CWS). One nest found on Little Creek Ridge was in a sugar maple (LPBO).

Egg dates: 20 May – 25 June

Magnolia Warbler (*Dendroica magnolia*)

Rare and occasional.

Although somewhat south of its normal breeding range, this warbler is noted frequently enough for it to be considered as a

rare nesting species in some of the evergreen woodlands on Long Point.

There are three summer records. One was reported on 1 July 1972 by the LPBO (Goodwin 1973a). In 1975, a male maintained a territory at the edge of the white pine – white cedar forest census area. J. McCracken (CWS) heard and saw a singing male at Squires Ridge on 17 June 1980.

Snyder (1931) refers to a Magnolia Warbler seen and heard by W.E. Saunders on the mainland at Fishers Glen in July, about the year 1926. A.W. Preston (MS) saw one near Port Dover on 15 July 1944. Another mainland record is of a pair of singing males noted by G. North in June 1971 near St. Williams (Goodwin 1971). Mr. North informs us that the species has summered there at least since the 1930s. Two males were also reported from Turkey Point on 1 July 1973 (Goodwin 1973b).

***Black-throated Green Warbler (*Dendroica virens*)**

Locally rare and occasional; formerly more common.

This species occurs rarely in pine woodlands on Long Point and on the mainland. Snyder (1931) found it surprisingly common and regular on Squires Ridge in the summer of 1927. Five males were found singing there on 8 July (J.L. Baillie, MS). Three males were reported singing on a ridge west of Squires on 1 July 1927 (L.L. Snyder, MS). The species is now much rarer, however, and there are few recent summer records from the Point. R. Curry reported birds singing on 26 June 1971 (Goodwin 1971) and one was seen on Courtright Ridge on 24 June 1975 and on 15 July 1977 (LPBO).

There is only one nest record: 21 June 1927, in a white pine on Squires Ridge (Snyder 1931). On the mainland, G. North reports having seen a young bird at St. Williams on 11 August 1935.

Blackburnian Warbler (*Dendroica fusca*)

Very rare and casual.

Snyder (1931) reported that the Blackburnian Warbler was a rare summer

resident on Long Point. In 1927, he collected a singing male on 29 June, saw a female on 7 July near the location where the male had been collected, and saw two singing males on 8 July, all on Squires Ridge. We are aware of only two recent summer records for Long Point; a male and two females at the lighthouse on 22 June 1972, and a male at the tamarack – white cedar slough census area on 27 June 1975 (LPBO). Godfrey (1966) reports that the Blackburnian Warbler has been found nesting near Long Point, but no details are given.

Pine Warbler (*Dendroica pinus*)

Very rare and casual.

Snyder (1931) reported the collection of two juvenile Pine Warblers from a pine grove on Courtright Ridge on 4 July 1927; another was collected from that area on 23 July. We are aware of no other summer records from Long Point, but the species is regularly encountered in certain tracts of pine woods on the adjacent mainland. G. North informs us that it is a fairly common summer resident there, and Nol *et al.* (1978) reported it as a territorial species in the Backus Woods.

***Common Yellowthroat (*Geothlypis trichas*)**

Abundant and regular.

The yellowthroat occurs widely throughout Long Point, especially in and about the marshes and along the shrubby edges of ponds and sloughs. Densities were greatest in the dense grassy marsh – shrub carr (118 territories/km²), the red oak – sugar maple savannah (87/km²), birch–oak savannah and wetland (85/km²), and wet grassy marsh (60/km²) census areas. Yellowthroats also held territories in the recreational dune area, sedge–tamarack dune pond, tamarack – white cedar slough, wet woodland, red oak – basswood savannah, red oak – sugar maple forest, and white pine – white cedar forest.

There are 10 reports of nesting:

8 June 1927 – nest containing one egg on

Ryersons Island (Snyder 1931).

7 June 1969 – five nests, all containing eggs,

in the marshes at the base of the Point (J. Bax, pers. commun.)

26 May 1974 – nest containing one egg (J. Bax, pers. commun.)

31 May 1979 – nest containing four eggs in the Big Creek Marsh (J. McCracken, ONRS).

26 June 1979 – three young fledged from a nest in the Hahn Marsh (J. McCracken, ONRS).

17 June 1980 – nest containing three young in a buttonbush swamp at Cedar Creek (J. McCracken, CWS).

***American Redstart (*Setophaga ruticilla*)**

Common and irregular; formerly more common.

The redstart is less common on Long Point now than it was a few decades ago; Snyder (1931) regarded it as one of the most common birds of the Point, even more numerous than on the mainland. A.W. Preston (MS) noted that it was moderately common in the Port Dover area, but found its populations declining there about 1932. He also noted that the species was much more common near Lake Erie, seldom, if ever, being observed more than 3 km from the lake. Snyder (1957) reported that the summer occurrence of redstarts was notably sporadic in southern Ontario. The decline in numbers on Long Point is difficult to explain. The species favours open deciduous and mixed woodlands, and second growth where there is an adequate understory. It is possible that the understory was formerly more prominent in the region than it has been in recent years. The redstart has been reported as a territorial species on only three census plots: tamarack – white cedar slough, red oak – sugar maple forest, and wet woodland.

There are seven reports of nests, only one of which is recent:

30 May 1927 – nest under construction in an elder on Ryersons Island (J.L. Baillie, MS).

21 June 1927 – nest under construction on Squires Ridge (L.L. Snyder, MS).

1 July 1927 – nest containing young in a burnt-over area (J.L. Baillie, ONRS).

4 July 1927 – two nests found in scrub oaks on Courtright Ridge (J.L. Baillie, ONRS).

7 July 1927 – nest in a shrub on Squires Ridge (L.L. Snyder, MS).

22 June 1974 – nest containing one egg in a tamarack at the edge of the tamarack – white cedar slough census area (G. Miller, ONRS).

***House Sparrow (*Passer domesticus*)**

Locally abundant and regular (introduced).

The House Sparrow only nests where buildings and nestboxes afford suitable sites. Therefore it is much more common in residential areas at the base of the Point than it is towards the tip.

We are aware of over 40 nest records. A few of these are of interest: three were in Barn Swallow nests, one was in a Cliff Swallow nest, and one was in a beached sailboat. Nesting begins very early in the season — construction of nests has been noted in Port Rowan as early as 28 February and 8 April (G. Bennett, ONRS). Two or more nestings may be completed in a season.

Egg dates: 24 April – 19 July

Bobolink (*Dolichonyx oryzivorus*)

Uncommon and irregular.

The Bobolink nests more commonly on the mainland than on the Point. Snyder (1931) reported a similar distribution. Bobolinks prefer upland meadows and fields for nesting and they probably become less common on Long Point in years of high water. The only census plot on which territories were reported was the intergrading dune-swale-savannah. Although there are no reports of nests, there are frequent summer sightings, including four males on 10 June 1966, six males singing on 22 June 1972, a few singing 1 July and 5 July 1972, one on 11 June 1975, and one on 7 July 1978 (LPBO). Most sightings are reported from locations within about 10 km of the eastern end of the Point.

***Eastern Meadowlark (*Sturnella magna*)**

Common and regular.

As in the case of the Bobolink, the meadowlark is less common on Long Point than on the adjacent mainland. It prefers to

nest in dry, grassy fields and breeding populations probably decline in years of high water. Meadowlarks have been reported on the following census plots: intergrading dune-swale-savannah (21 territories/km²), recreational dune area, bluegrass-milkweed grassland, dry juniper-cottonwood savannah, and sedge-tamarack dune pond.

Snyder (1931) regarded the meadowlark as a rare species on Long Point. In fact, its numbers have probably not increased since that time—Snyder did not investigate the eastern portions of the Point where appropriate habitat occurs.

We are aware of 18 nest records, most of them for locations within 5 km of the tip. Although several recent nestings have been reported from the Port Rowan sewage lagoons, none have been reported from the Point itself since 1973. An adult was seen carrying a faecal sac, however, on 9 June 1978 about 10 km from the eastern end of the Point (R. Hurst, LPBO).

Egg dates: 14 May – 10 July

***Redwinged Blackbird (*Agelaius phoeniceus*)**

Abundant and regular.

The redwing is undoubtedly the most common and widespread nesting species on Long Point. It has occurred on every census area except one, the intergrading dune-swale-savannah. The greatest densities were reported for the following census plots: cattail marsh (3607 territories/km²), sedge-tamarack dune pond (393/km²), wet grassy marsh (320/km²), red oak – basswood savannah (313/km²), dense grassy marsh – shrub carr (265/km²), red oak – sugar maple savannah (233/km²), tamarack – white cedar slough (160/km²), red oak – sugar maple forest (116/km²), birch-oak savannah and wetland (103/km²), dry juniper-cottonwood savannah (96/km²), and sedge-rush-swale (34/km²). It should be pointed out that the astonishingly high density reported for the cattail marsh (Dunn and Nol 1977) is not typical of the main cattail marshes of Long Point. Some sections are apparently favoured over others and densities are probably not



nearly as great in the larger, unbroken stretches of cattail.

We are aware of over 650 nest records for the species. Of 636 nestings for which the habitat was recorded, 50% were in cattail, 29% in grasses or sedges, 7% in other herbaceous plants, and 14% in shrubs and trees. Although nests with eggs have been found as early as 3 May, most egg laying does not begin until the last week in May. Two broods are sometimes raised in a season.

Egg dates: 3 May – 12 July

***Northern Oriole (*Icterus galbula*)**

Abundant and regular.

This is one of the most common breeding birds of Long Point and it is equally common on the mainland. It nests in tall shade trees in deciduous woodlands. The species apparently favours birches on the eastern portion of the Point, but nests have also been found in tamaracks, cottonwoods, maples, and oaks. Densities were greatest on the birch-oak savannah and wetland (120 territorial males/km²), tamarack – white cedar slough (91/km²), and red oak – sugar maple savannah (67/km²) study areas. Orioles have also been found on the intergrading dune-swale-savannah, sedge-tamarack dune pond, wet woodland, red oak – basswood savannah, and red oak – sugar maple forest census plots.

We are aware of 26 nest records for the Point, but the contents of relatively few of these nests were inspected, no doubt because

of the great heights at which they were situated. Nests are much easier to detect when the young are fairly old and noisy; young have been noted in the nest until 1 July. The only records of nests with eggs are as follows:
 15 June 1978 – one egg and three young in a nest in a birch about 10 km from the eastern end of the Point (R. Hurst, ONRS).
 11 June 1979 – three cold eggs in a nest in a dogwood thicket at the edge of the Hahn Marsh (F. Hubbs, ONRS).

***Brewer's Blackbird (*Euphagus cyanocephalus*)**

Very rare and casual.

The breeding range of this western species has undergone widespread eastward expansions in recent years. Stepney and Power (1973) report that its range has expanded about 1100 km into the Great Lakes region in the last 60 years. Their map shows Long Point as the most southerly breeding location in Ontario. There is only one nest record for Long Point. The nest contained four eggs in an open-faced bird box near the eastern end of the Point on 31 May 1970 (G. Holroyd, ONRS). The nest later fledged young after they had been banded in the nest by D. Brewer (LPBO). They were subsequently recaptured a few days later (J. Woodford, LPBO). Although this nesting was clearly an unusual and isolated occurrence, the species may be expected to recur on Long Point if its range continues to expand.

***Common Grackle (*Quiscalus quiscula*)**

Abundant and regular.

Although widespread, this species tends to nest in loose colonies and therefore may be absent from many areas. Colonies are typically in cedar and pine groves, but the species can occur in a variety of other habitats.

The greatest densities on the census plots were: wet woodland (254 territories/km²), dry juniper-cottonwood savannah (108/km²), red oak – basswood savannah (107/km²), tamarack – white cedar slough (99/km²), and red oak – sugar maple savannah (67/km²). Grackles held territories on the following other study areas: wet grassy

marsh, dense grassy marsh – shrub carr, recreational dune area, birch-oak savannah and wetland, white pine – white cedar forest, and red oak – sugar maple forest.

We are aware of over 80 records of nests at Long Point. Unusual nest sites included nine in tree cavities (usually open-faced), one in a bird box with the side open, five in stands of cattail, and a few in hawthorns and other deciduous shrubs. In 1978, one pair even nested among the roots of a dead tree that had been washed into the middle of one of the widest channels near Courtright Ridge.

Egg dates: 27 April – 19 June

***Brown-headed Cowbird (*Molothrus ater*)**

Very common and regular.

The cowbird is probably more common at the base of the Point and on the adjacent mainland than it is on the outlying sections of the Point. As it is a parasitic species, it occurs in every habitat that is occupied by its favoured hosts. The nests of the following species have been parasitized at Long Point: Prothonotary Warbler (11), Red-winged Blackbird (9), Red-eyed Vireo (3), Cardinal (3), Yellow Warbler (2), Chipping Sparrow (2), Field Sparrow (2), American Redstart (1), Eastern Meadowlark (1), and Song Sparrow (1). "Territories" have been reported from the following census plots: recreational dune area, wet woodland, tamarack – white cedar slough, birch-oak savannah and wetland, and red oak – sugar maple savannah.

***Cardinal (*Cardinalis cardinalis*)**

Common to very common and regular.

The Cardinal has expanded its breeding range northward during this century, the first Canadian nesting being reported from Point Pelee in 1901 (Godfrey 1966). The first report of the species in the Long Point region was at Port Dover on 13 November 1913 (A.W. Preston, MS). Since that time, it has been steadily increasing in numbers. Nestings were reported on the mainland at Fishers Glen by R.V. Lindsay in 1927 (Snyder 1931), and

near Port Dover in 1942 (A.W. Preston, MS). At Long Point, Snyder (1931) reported a pair on Ryersons Island in 1927.

Cardinals prefer deciduous and evergreen thickets, hedges, and tangles on forest edges. They have been found on three census areas: wet woodland, tamarack – white cedar slough, and white pine – white cedar forest.

We are aware of three nestings on the Point and three others nearby on the mainland. The nesting season is evidently quite long; nests with eggs have been found as early as 24 April on the mainland and:

12 June 1973 – nest with four eggs in the tamarack – white cedar slough about 3 km from the eastern end of the Point (W. Joyce, LPBO).

7 July 1974 – nest containing three eggs; still contained eggs on 14 July, in the white pine – white cedar forest near the Gravelly Bay Road (G. Miller, ONRS).

4 June 1975 – nest containing three eggs in the same area as the preceding record (G. Miller, ONRS).

Rose-breasted Grosbeak (*Pheucticus ludovicianus*)

Rare and occasional.

Snyder (1931) did not record this species in the summer on Long Point and reported that it was not numerous on the mainland. A.W. Preston (MS) found it only as a rare summer resident in the Port Dover area. It is still a rare species on the Point, but has become more common on the adjacent mainland. Nol *et al.* (1978) found a density of 63 territorial males/km² on a census plot in the Backus Woods, and there are two nest records from there. Territories have not been reported for any of the census plots on the Point and no nests have been reported. However, there is a record of an adult with a juvenile on the Little Creek Ridges on 8 July 1967 (M. Bradstreet, LPBO). Two hatching-year birds were banded soon afterwards on 17 July and 21 July 1967 at the eastern end of the Point.

*** Indigo Bunting (*Passerina cyanea*)**

Common to very common and regular.

Indigo Buntings are most common along the edges of woodlands and fields at the base of the Point and on the mainland. Territories were reported for the white pine – white cedar forest, tamarack – white cedar slough, and wet woodland census areas.

Nests are difficult to find and we are aware of only one record. Snyder (1931) reported a nest containing one egg and three young on Courtright Ridge on 12 July 1927. An adult was observed carrying food on Courtright Ridge on 26 June 1927 (J.L. Baillie, MS).

American Goldfinch (*Carduelis tristis*)

Uncommon and regular.

This late-nesting species prefers open country with scattered deciduous shrubs. As such habitat is relatively scarce on the Point, the goldfinch is probably less common there than on sections of the adjacent mainland. Although no territories have been reported from any of the census areas, the species may have been overlooked because of its late nesting habits.

We are aware of no nest records, but adults have been seen gathering thistle down for nesting material. This behaviour was reported on 10 July 1927 on Courtright Ridge (J.L. Baillie, MS) and was also observed by J. McCracken near the Port Rowan dock in July 1975. Summer sightings of goldfinches at Long Point are regularly made by the LPBO; two were seen near the eastern end of the Point from 27 June – 3 July 1970, a few near the Gravelly Bay Road on 31 July 1971, three at the end of the Point on 22 June 1972, and two on 2 July 1972.

Rufous-sided Towhee (*Pipilo erythrophthalmus*)

Very common and regular.

Snyder (1931) reported that this species was an extremely rare summer resident on Long Point, but that it was more common on the adjacent mainland. Areas frequented by the species, however, were probably not

adequately explored by Snyder, because it is now known that the towhee is common in restricted habitats.

It has been reported as a territorial species on only two census plots: white pine – white cedar forest and red oak – sugar maple forest. It is probably more widespread on the mainland.

Although towhees undoubtedly nest on the Point, we have no breeding records. Eight nestings have been reported from the adjacent mainland, two of which are as follows:

15 May 1959 – nest with five eggs near St. Williams (C. Bennett, ONRS).

28 May 1976 – nest containing young near the Backus Woods (LPBO, ONRS).

Savannah Sparrow (*Passerculus sandwichensis*)

Very rare and occasional.

Snyder (1931) noted that suitable habitat was generally lacking for this species on the Point and this observation still applies. Savannah Sparrows are much more common on the adjacent mainland. We have only three records of the species on the Point: one bird was seen at the old lighthouse at the base of the Point in mid-July 1907 (W.E.C. Todd, MS); a territory was reported on the intergrading dune-swale-savannah census plot in 1967; and a regular visitor was reported in the same area in 1968. The only nest record is for the mainland – a nest with three eggs found at the Port Rowan sewage lagoons on 12 June 1977 (T. Dean, ONRS).

Henslow's Sparrow (*Ammodramus henslowii*)

Formerly locally common; now absent.

Snyder (1931) found this species in the wet, grassy flats between Courtright Ridge and Squires Ridge in the summer of 1927. J.L. Baillie (MS) estimated that there were about six pairs in the colony at that time and an adult was seen gathering nest material on 14 July 1927 (Snyder 1931). J. McNally informs us that a colony also once existed in the wet meadows north of the Provincial Park and he believes that they were nesting there in

1939. We are aware of no other summer records for the species on Long Point and it is thought to have been extirpated. G. North informs us that there used to be a large colony on the mainland a few kilometres southwest of the Backus Conservation Area. The only recent summer report of this sparrow in the region is provided by R. Copeland, who reports two territorial males present at Forestville in 1978.

Vesper Sparrow (*Pooecetes gramineus*)

Very rare and occasional.

Snyder (1931) did not find this species to be a summer resident on Long Point, but it is now known to occur very rarely. One territory was reported for the intergrading dune-swale-savannah census area in 1965 (Cobus *et al.* 1965). Vesper Sparrows are much more plentiful in the fields and meadows of the adjacent mainland, where four nestings have been reported.

*** Chipping Sparrow (*Spizella passerina*)**

Very common to abundant and regular.

Snyder (1931) regarded the Chipping Sparrow as one of the most common summer residents of the region. On Long Point, it seems to be most common on the eastern portions where it can be found nesting in ground juniper and red cedar at the edges of mixed woodlands and in the juniper savannahs. Territories have been reported from the intergrading dune-swale-savannah, dry juniper-cottonwood savannah, tamarack – white cedar slough, white pine – white cedar forest, and sedge-tamarack dune pond census plots.

There are 10 nest records; the first reported on 22 June 1927 at Courtright Ridge (J.L. Baillie, MS).

Egg dates: 31 May – 7 July

*** Field Sparrow (*Spizella pusilla*)**

Very common and regular.

It is surprising that Snyder (1931) failed to find Field Sparrows on Long Point. Although populations may have increased since then, it seems likely that Snyder over-

looked the species, as he seldom went to the eastern portions of the Point where Field Sparrows are probably most common.

On the eastern portions of Long Point, Field Sparrows occur in habitats very similar to those chosen by Chipping Sparrows, namely the edges of mixed woodlands and in the juniper savannahs. The Field Sparrow is more of a ground-nesting species, however, and grassier areas are favoured. Seven of 11 nests reported were in ground juniper; the remaining four were on the ground.

Densities were greatest on the dry juniper-cottonwood savannah (42 territorial males/km²) census plot. Territories were also reported for the bluegrass - milkweed grassland, recreational dune area, intergrading dune-swale-savannah, and white pine - white cedar forest plots.

The first reported nest contained three eggs in a ground juniper near the eastern end of the Point on 19 June 1965 (LPBO, ONRS). Eleven nests have been reported since then.

Egg dates: 21 May - 27 July

*** Swamp Sparrow (*Melospiza georgiana*)**
Abundant and regular; formerly less common.

Snyder (1931) found that the Swamp Sparrow was not a plentiful summer resident on Long Point, noting only "a few here and there". W.E.C. Todd (MS) found it moderately common about the edges of the marshes at Long Point in July 1907. Populations have increased substantially since these early records, possibly due to the creation of suitable marsh habitat at the base of the Point following the construction of the Causeway in 1928.

The Swamp Sparrow favours dense grassy marshes, particularly those that have a scattering of shrubs or other prominent plants. It is much less common in the main cattail marshes than it is at the base of the Point. Small populations occur in some of the marshy areas lying between the main ridges (e.g. Anderson Pond). Densities were greatest in the dense grassy marsh - shrub carr (218 territories/km²) and wet grassy marsh (195/km²) census plots.

Nests are difficult to locate and there are only eight records. The first was of a nest containing five eggs on 24 May 1959 (G. Peck, ONRS). The remaining nests were reported from the Hahn Marsh and Big Creek Marsh in 1978 and 1979 (J. McCracken and F. Hubbs, ONRS).

Egg dates: 14 May - 12 June

*** Song Sparrow (*Melospiza melodia*)**

Very common and regular.

The Song Sparrow is as common on Long Point as on the mainland. It nests in most open shrubby habitats as well as in thickets near the edges of woodlands, marshes, swamps, and dwellings. Territories were held on the following census areas: dense grassy marsh - shrub carr, wet woodland, intergrading dune-swale-savannah, dry juniper-cottonwood savannah, sedge-tamarack dune pond, tamarack - white cedar slough, red oak - sugar maple savannah, and red oak - basswood savannah. Nests are usually on the ground in clumps of grass, but can also be found in shrubs, particularly ground juniper near the eastern end of the Point.

There are 16 nest records. The first is a nest with three eggs on 18 May 1928 on Second Island (Snyder 1931). Egg laying begins about the middle of May and most nests have fledged young by the end of June.

Egg dates: 15 May - 10 July

3. Breeding species of the adjacent mainland

There are two reasons for our inclusion of a list of species that breed on the adjacent mainland but are not known to be summer residents on Long Point (Table 20). First, some of these species may breed very occasionally on Long Point. Second, it emphasizes the paucity of breeding bird fauna of Long Point in relation to the relative richness of the adjacent mainland. Many species (primarily landbirds) already dealt with in the annotated list occur on the Point in fewer numbers than is characteristic of the mainland breeding population. Snyder (1931) had previously remarked on this feature at Long Point, as had Taverner (1914) at Point Pelee.

Although the isolation of peninsulas may reduce the variety of breeding species (Emlen 1973, Ricklefs 1973), the role of habitat as a determinant of breeding bird variety is probably of great importance on Long Point. Most of the habitats of the Point are in the early stages of succession. These stages typically contain relatively few bird species and a less equitable apportioning of the individuals among the various species than do more mature stages. In addition, Long Point does not contain suitable habitat for many of the resident species of the region. This is particularly true of species that nest in upland fields, deciduous shrubbery, climax deciduous forests, second growth woodlands, large tracts of mature pine woods, or in residential and agricultural areas. Many such species are either absent from Long Point (Table 20) or are present in low numbers relative to their occurrence on the adjacent mainland.

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Appendix I

Scientific names of plants mentioned in the text. The arrangement of families and species follows Fernald (1950).

Equisetaceae

Horsetail, *Equisetum hyemale*

Variegated horsetail, *Equisetum variegatum*

Polypodiaceae

Marsh fern, *Dryopteris thelypteris*

Bracken fern, *Pteridium aquilinum*

Pinaceae

Tamarack, *Larix laricina*

White pine, *Pinus strobus*

White cedar, *Thuja occidentalis*

Ground juniper, *Juniperus communis*

Red cedar, *Juniperus virginiana*

Typhaceae

Broad-leaved cattail, *Typha latifolia*

Narrow-leaved cattail, *Typha angustifolia*

Stout narrow-leaved cattail, *Typha glauca*

Sparganiaceae

Giant burreed, *Sparganium eurycarpum*

Alismataceae

Broad-leaved arrowhead, *Sagittaria latifolia*

Gramineae

Canada bluegrass, *Poa compressa*

Kentucky bluegrass, *Poa pratensis*

Reed grass, *Phragmites communis*

Tall couch grass, *Agropyron trachycaulum*

Canada wild rye, *Elymus canadensis*

Sand dropseed, *Sporobolus cryptandrus*

Bluejoint grass, *Calamagrostis canadensis*

Dune grass, *Ammophila brevifolius*

Rice cutgrass, *Leersia oryzoides*

Wild rice, *Zizania aquatica*

Little bluestem, *Andropogon scoparius*

Bluestem beard grass, *Andropogon gerardii*

Switch grass, *Panicum virgatum*

Indian grass, *Sorghastrum nutans*

Cyperaceae

Elliptical spikerush, *Eleocharis elliptica*

Chairmaker's rush, *Scirpus americanus*

Soft-stem bulrush, *Scirpus validus*

Sedge, *Carex rosea*

Sedge, *Carex pensylvanica*

Water sedge, *Carex aquatilis*

Sedge, *Carex stricta*

Lemnaceae

Lesser duckweed, *Lemna minor*

Juncaceae

Baltic rush, *Juncus balticus*

Alpine rush, *Juncus alpinus*

Salicaceae

Eastern cottonwood, *Populus deltoides*

Juglandaceae

Black walnut, *Juglans nigra*

Corylaceae

Hop hornbeam, *Ostrya virginiana*

White birch, *Betula papyrifera*

Speckled alder, *Alnus rugosa*

Fagaceae

White oak, *Quercus alba*

Yellow oak, *Quercus bicolor*

Red oak, *Quercus rubra*

Urticaceae

Stinging nettle, *Urtica procera*

False nettle, *Boehmeria cylindrica*

Polygonaceae

Water smartweed, *Polygonum amphibium*

Chenopodiaceae

Russian thistle, *Salsola kali*

Caryophyllaceae

Sandwort, *Arenaria serpyllifolia*

Nymphaeaceae

Bull-head lily, *Nuphar variegatum*

Fragrant water lily, *Nymphaea odorata*

Lauraceae

Sassafras, *Sassafras albidum*

Cruciferae

Sea-rocket, *Cakile edentula*

Lyre-leaved rock cress, *Arabis lyrata*

Saxifragaceae

Cross-of-parnassus, *Parnassia glauca*

Rosaceae

Marsh cinquefoil, *Potentilla palustris*

Rose, *Rosa* spp.

Choke cherry, *Prunus virginiana*

Leguminosae

White sweet clover, *Melilotus alba*

Beach pea, *Lathyrus japonicus*

Linaceae

Yellow flax, *Linum medium*

Aceraceae

Sugar maple, *Acer saccharum*

Red maple, *Acer rubrum*

Silver maple, *Acer saccharinum*

Vitaceae

River-bank grape, *Vitis riparia*

Tiliaceae

American basswood, *Tilia americana*

Guttiferae

St. John's-wort, *Hypericum* spp.

Lythraceae

Swamp loosestrife, *Decodon verticillatus*

Cornaceae

Dogwood, *Cornus* spp.

Red-osier dogwood, *Cornus rugosa*

Ericaceae

Bearberry, *Arctostaphylos uva-ursi*

Oleaceae

White ash, *Fraxinus americana*

Black ash, *Fraxinus nigra*

Red ash, *Fraxinus pennsylvanica*

Primulaceae

Starflower, *Trientalis borealis*

Asclepiadaceae

Swamp milkweed, *Asclepias incarnata*

Common milkweed, *Asclepias syriaca*

Borraginaceae

Puccoon, *Lithospermum carolinense*

Hound's tongue, *Cynoglossum officinale*

Labiatae

Common skullcap, *Scutellaria epalobiifolia*

Solanaceae

Nightshade, *Solanum nigrum*

Deadly nightshade, *Solanum dulcamara*

Ground cherry, *Physalis heterophylla*

Scrophulariaceae

Common mullein, *Verbascum thapsus*

Scarlet painted cup, *Castilleja coccinea*

Lentibulariaceae

Great bladderwort, *Utricularia vulgaris*

Rubiaceae

Buttonbush, *Cephalanthus occidentalis*

Campanulaceae

Kalm's lobelia, *Lobelia kalmii*

Compositae

Gray goldenrod, *Solidago nemoralis*

Horseweed, *Erigeron canadensis*

Beggar-tick, *Bidens* spp.

Sneezeweed, *Helenium autumnale*

Wormwood, *Artemisia caudata*

Swamp thistle, *Cirsium muticum*

Field thistle, *Sonchus arvensis*

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